

MUNICIPAL JOURNAL

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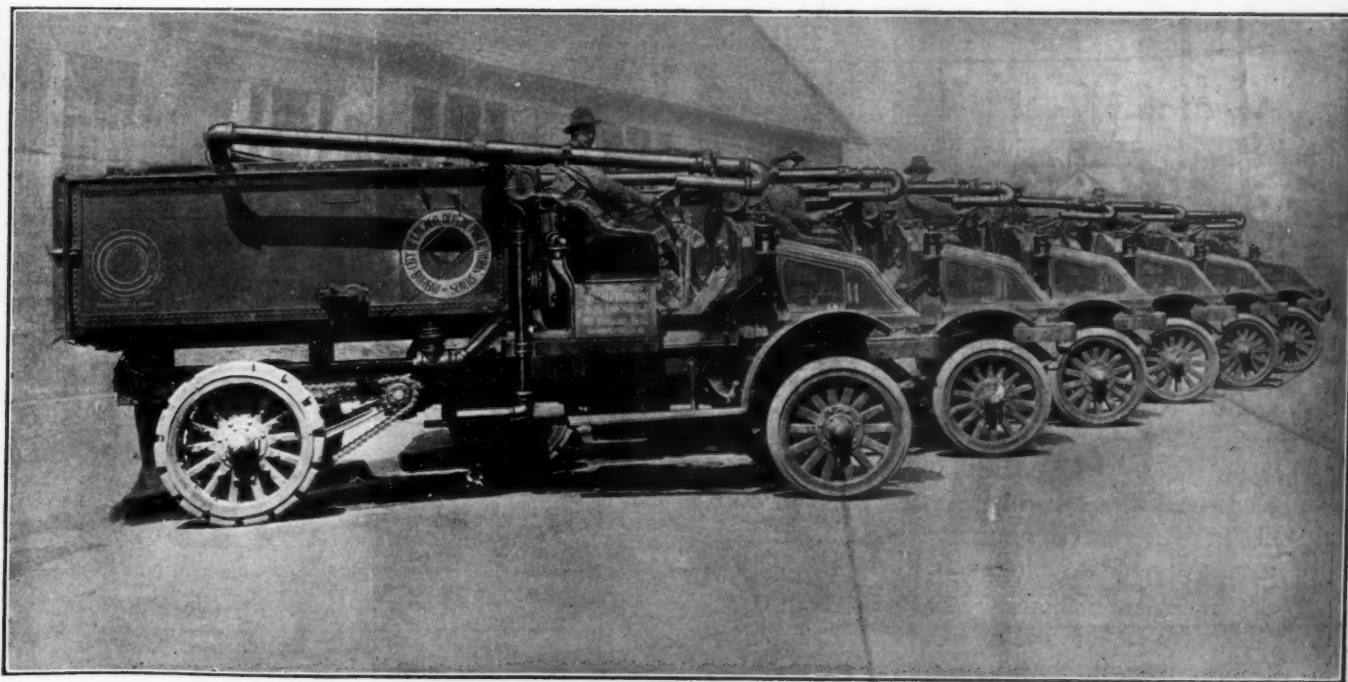
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Strangling the Periodicals

CONGRESS at its last session passed a hasty postal law increasing the postage on periodicals from FIFTY TO NINE HUNDRED PER CENT. THROUGH A POSTAL "ZONE" LAW. *The postal "zone" system was abolished by Abraham Lincoln in 1863 on the recommendation of Postmaster General Blair and has since also been condemned by U. S. Postal Commissions.*

Under the postal zone law some periodicals will be killed—all will be crippled. There will be fewer readers, and the habit of reading curtailed. The great functions of periodicals is to assist in the spread of ideas—by printing the achievements in the world of thought, culture, and science.

Thus to shut out farm journals—as these zone rates will—will lessen the productive power of our country by millions of dollars through loss of better methods. Shut off trade journals and you decrease the manufacturing power by more millions. Shut off the religious papers and there are shut off channels that have raised millions of dollars for distressed humanity. Shut off the great periodicals of the home and there is throttled an avenue that has given expert instruction to hundreds of thousands of mothers and saved their babies to health and citizenship.

These national periodicals are printed in the big cities—and the first zone, the cheapest zone, is in or near those cities; there are many educational opportunities near cities, and the cities will read anyway. Small towns and distant districts depend to a large extent upon periodicals; thus this law increasing periodical postage where it is most needed shuts off opportunity where needed. It penalizes periodical readers.

Congressman Claude Kitchin of North Carolina, who fathered it and compelled its adoption, refusing hearings on the measure—it had been twice defeated by the Senate—stated in his speech in Congress that it was not a War Revenue amendment but permanent postal legislation.

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The postal amendment passed by the last Congress increasing the postage on periodicals from FIFTY TO NINE HUNDRED PER CENT, with its postal "zone" system will throttle or destroy our periodicals at a time when the widest and most extensive circulation of publications is essential to the patriotism, education and upbuilding of our country.

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S. W. HUME, President. J. T. MORRIS, Treasurer and Manager. A. PRESCOTT FOLWELL, Secretary

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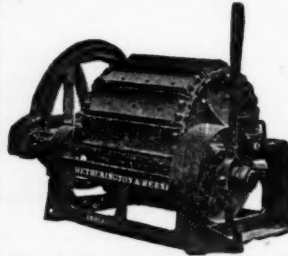
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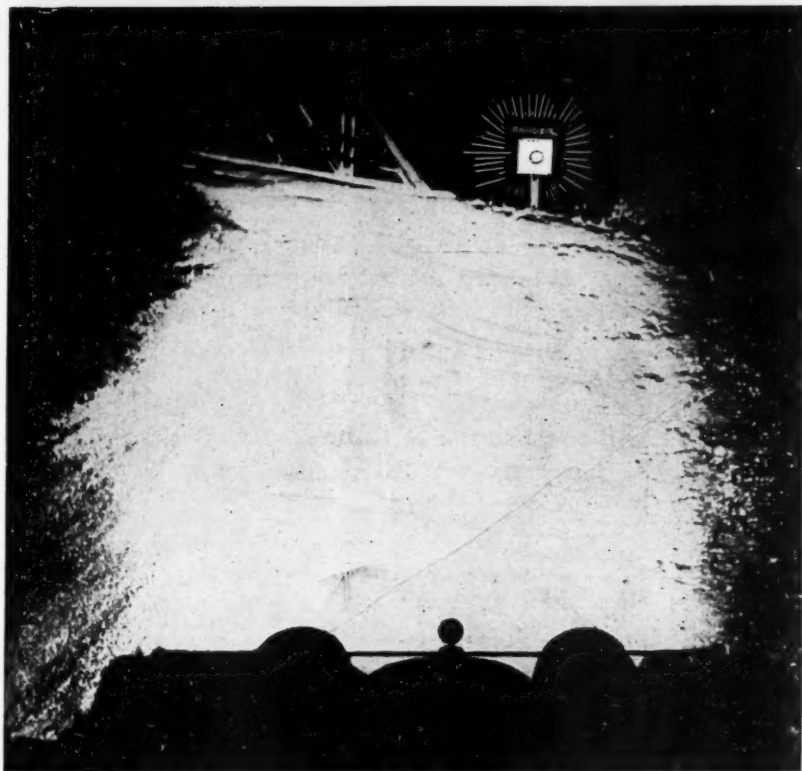
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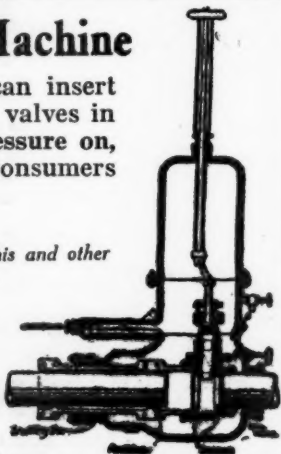
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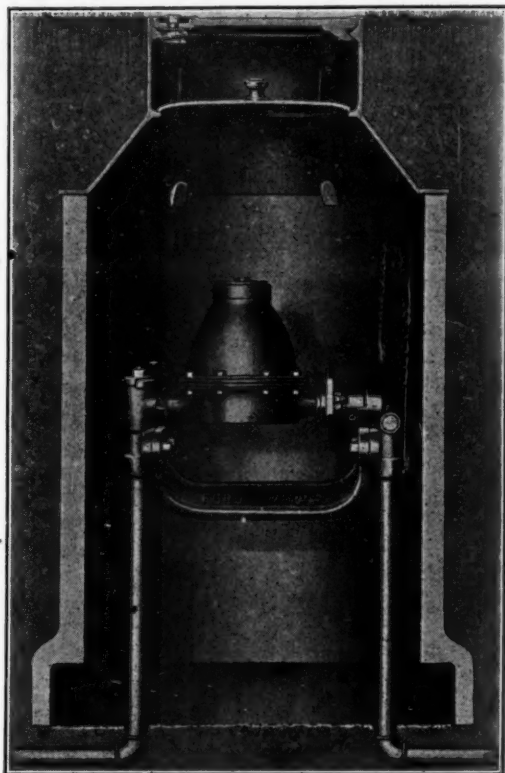
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Municipal Journal

Volume XLIV.

NEW YORK, JUNE 29, 1918

No. 26

THE LEGAL STATUS OF STREAM POLLUTION

**Digest of Judicial Decisions, Interpreting Both Common Law and Enactments of State Legislatures—
Drainage of Surface Water—Discharge Into Streams of Sewage and Manufacturing
Wastes—Joint Action and Responsibility.**

The United States Public Health Service has just issued a bulletin giving a digest of judicial decisions concerning stream pollution and a compilation of legislation relating to the subject, which bulletin was prepared by Stanley D. Montgomery and Prof. Earle B. Phelps. This brings the legislation practically to date, in that it includes laws in force at the end of the 1917 sessions of the various state legislatures, except that the 1917 laws were not available for Alabama, Arkansas, District of Columbia, Florida, Pennsylvania, Indiana, Iowa, Kansas, Kentucky, Mississippi, Nebraska, Oklahoma, the Philippines, Rhode Island, Vermont, Virginia and Wisconsin; several of which states, however, had had no legislatures in session since 1915. This digest should prove of the greatest service to all who are interested or who may in the future become interested in the matter of the pollution of streams by sewage and in other engineering matters involving stream pollution, as well as to those who may wish to draw up laws, municipal, state or federal, relative to stream pollution.

In making this study, it was found necessary to ascertain the precise status of legislation relating to the pollution of streams and other water supplies, inasmuch as the whole subject of the control of stream pollution is bound up with the limitations imposed by common law and statute. Although knowledge of the laws themselves was required, even more important was a knowledge of court decisions and an analysis of the trend of these decisions. The court decisions are numerous and in fact, until recent years, when the states began enacting specific legislation on the subject, the rights of riparian owners were enforced by court decisions interpreting the provisions of the common law. Even now it is to these decisions more than to the law itself that one must turn for an understanding of how the problem is being met from a legal point of view. For these reasons, the first and more important part of this bulletin is devoted to a digest of court decisions, although the more voluminous portion which supplements this comprises a compilation of all of the state laws and health regulations that seem closely related to the subject of pollution of streams.

The digest of judicial decisions is excellently arranged typographically, three classes of type being used, black faced type for the statements of the essential principles contained in various digests, a less conspicuous type for explaining and amplifying these statements, while the smallest size of type is used for quotations of portions of the digests themselves. The bulletin should be obtained by all who are interested in the subject (it is for

sale by the Superintendent of Documents at Washington at 30c per copy), but a general statement of the various principles, as conveyed by the black-faced type, is given below for general information.

The basic rule of the common law has been stated to be that each riparian proprietor has the right to have the stream come down to him with its quality unimpaired and with its quantity undiminished. However, from the fact that each riparian proprietor has a dual interest in the stream, it logically and necessarily results that each riparian proprietor is permitted to make of the stream a reasonable use and no more; and the true rule may be stated to be that each riparian proprietor has the right to have the stream flow through or past his land with its quality unimpaired and its quantity undiminished, except in such manner and to such extent as may result from a reasonable use of the stream by riparian proprietors above him. The courts have generally favored those uses of a stream that may be classed as natural, such as domestic use, watering of cattle, etc., as distinguished from artificial uses like manufacturing. But although a use may be classed as a natural one, if it be exercised immoderately or excessively it becomes unreasonable and illegal.

Ordinarily the drainage of surface water cannot be made the ground of complaint even though it causes injury to a lower riparian proprietor. According to a New York decision: "The owner of lands drained by a watercourse may change and control the natural flow of the surface water thereon, and by ditches or otherwise accelerate the flow or increase the volume of water which reaches the stream, and if he does this in the reasonable use of his premises, he exercises only a legal right and incurs no liability to a lower proprietor." But one draining the surface water into a natural stream will not be permitted to cause the capacity of the stream to be exceeded so as to overflow to the injury of a lower riparian proprietor. Moreover, while the riparian proprietor may accelerate the runoff of surface water into a natural stream, he will not be permitted to divert it from its natural course.

Discharging waste from a manufacturing plant or mine into a stream is not a natural use of a stream and if done to the material injury of the lower riparian proprietor, creates a liability for damages. (Several qualifications of this statement are referred to in the bulletin as made by the state courts.) The fact that a manufacturer is engaged in an important industry, the operation of which benefits the public, will not be held to excuse him for polluting the stream to the injury of the lower proprie-

tor. It has been held that even where a lower proprietor can, at comparatively small expense, protect himself against the injury caused by an upper proprietor engaged in an important business, he is not bound to do so. The courts of Pennsylvania and Indiana have adhered to doctrines as to mining that are expressly repudiated elsewhere, these states holding that mine operators have a right to pollute streams by pumping into them water from their mines.

It has been held that evidence of the custom of the region in which the stream is located may be relevant as bearing upon reasonableness of a given use, but several courts have held that evidence of custom cannot be relevant. Courts have, however, intimated that new and unusual uses of streams will be regarded more jealously than common or customary ones.

The fact that others than the defendant or even the plaintiff himself are polluting the same stream will not excuse the defendant, but evidence that others than the defendant have contributed to the pollution of a stream is admissible for the purpose of showing that not all the damage sustained by the plaintiff was caused by the defendant. Where a stream has been polluted from various causes for longer than a prescriptive period to such an extent that it has become a common sewer, the right to pollute it cannot be challenged.

When a stream is polluted by an upper riparian owner in an unreasonable use or to an unreasonable extent, any lower riparian proprietor who is injured thereby has a right of action at common law for the actual damages sustained by him. It is improper, in an action for damages, for several riparian proprietors to join as plaintiffs. Each should sue separately for the damages he has sustained. Also it has been held to be improper to join several defendants in an action for damages arising from the pollution of a stream to which the various defendants contributed independently. There are, however, some decisions to the contrary, the reasoning being that it is impossible to separate the injury done by the several contributors and that to deny their joint liability is to leave the lower proprietor without remedy for the injury he has sustained. Where the cause of injury to a stream has been maintained by succeeding proprietors, the lower proprietor will not be permitted to join them in an action for damages but must sue each separately.

An unreasonable use of a stream which pollutes it to the injury of a lower riparian proprietor will be enjoined, and several who contribute individually to the pollution of the same stream may be joined as defendants in one suit for an injunction, and several individuals who are injured by the pollution of the same stream may join in an action for an injunction. To entitle a riparian owner to an injunction against polluting a stream, the injury of which he complains must be real and material. But although the injury to the stream must be real in order to entitle the plaintiff to injunctive relief, it does not follow that the plaintiff must have suffered any actual damage in his present use of the stream. In suits for injunction against pollution of streams, the general rule that a nuisance will not be enjoined in an equity suit until its existence has first been established in an action at law does not obtain, the reason being that the delay incident to the establishing of the right in an action at law might cause irreparable injury.

Where the effect produced by the pollution of a stream amounts to a public nuisance, the state by its attorney general may bring an action for an injunction against the continuance of the pollution. As against a lower riparian proprietor, a right to pollute a stream may be acquired by prescription; but where a right by prescrip-

tion is acquired, it is limited by the use actually made during the entire statutory period. However, a right to create a public nuisance can not be acquired even by prescription, nor can a right by prescription be acquired that will authorize the doing of anything forbidden by statute.

By the great weight of authority, municipalities have no greater rights than individuals to pollute water courses and must respond in damages for any injury caused to a lower riparian proprietor, and may be enjoined from continuing the pollution. A municipality is not liable for the pollution of a stream caused by the ordinary drainage of surface water, but where a city alters the natural course of drainage and causes material increase in the quantity of the flow in a given direction and material injury results, the city is liable for the injury. Also, a city will not be permitted to build artificial drains and thereby conduct surface water into a stream in such quantities as to exceed the capacity of the stream and cause the same to overflow to the injury of a lower proprietor. At common law a city seeking to maintain the purity of a stream, as a lower riparian proprietor, has no greater right than an individual to limit the use of a stream by upper proprietors.

The above relates to judicial decisions relative to the basic rule of common law. Riparian rights have, however, been altered in varying degrees by statutes enacted in the several states, these dealing chiefly with the discharge of sewage into streams. The increase of population has made more urgent the problem of disposing of the increased quantities of sewage, while on the other hand, this increased quantity both of sewage and of factory waste, polluting the stream to such an extent as to destroy fish life and render the water unfit for domestic use and greatly curtail the quantity available for public use, has required that some limitations be placed on the character and quantity of sewage and waste that is permitted to enter the streams. Also, the legislation naturally reflects the advance in the science of bacteriology and the improvements made in sewage purification. It, therefore, becomes apparent that the state, like the individual riparian proprietor, has a dual interest in the stream; on the one hand, the necessity for using it to receive the drainage of cities, and on the other hand that of safeguarding the health of its citizens and protecting the public water supplies.

To protect its streams against pollution, a state may, without providing compensation, curtail the rights of the riparian owner in his use of the stream, according to the weight of authority. Even though a riparian owner may have acquired a right by prescription as against lower proprietors on the stream to pollute the same, he is nevertheless amenable to legislation enacted under the police power for the preservation of the purity of the stream, and can not claim compensation unless the same is provided for in the legislation. Such legislation is not rendered invalid by the fact that it is made applicable to a portion of the state only, provided no unreasonable or arbitrary classification be adopted. Most courts construe strictly statutes for this purpose and hold that such construction does not render them unconstitutional. Some courts have held that statutes enacted for the preservation of streams should be liberally construed in favor of the riparian owner. A state may leave to a commission or board the details of legislation for protection of its waters.

While the powers of the state to prevent pollution have been held to be very broad, the power of the state to authorize the discharge of sewage into streams to the injury of lower proprietors is limited by constitutional provisions. By the great weight of authority, statutes

will not be construed as authorizing municipalities to create nuisances by the discharge of sewage, even in those jurisdictions where the constitutional inhibition does not obtain.

As before stated, the above principles are in each case followed by quotations from decisions of various courts, and many qualifications of the general principles are found in the digest, it being the general rule that a decision made in a given state is adhered to by the courts of that state in all later decisions. Consequently, in studying the status of any particular point for a given locality, it is desirable to refer to the decisions upon that point which have been rendered by the courts of the state in question. This bulletin, in connection with the principles above stated, has cited, by longer or shorter quotations, 710 cases from the various states of the country, some individual cases being cited in connection with six or eight different points or principles.

CITY PLANNING FOR DAVENPORT

Recommendations Concerning Street Widths, Sizes of Blocks, Set-Back Lines, Building Zones and Excess Condemnation—Some Detail Plans.

In February, 1917, the City Council of Davenport, Iowa, directed the city engineer, Roscoe E. Sawistowsky, to "prepare a comprehensive plan for the orderly development and extension of the street system" of that city, including therein recommendations concerning development of land tracts, sizes of lots, building lines, districting and "other matters pertinent to such plan." The report containing these matters was presented about a year later and has been published in pamphlet form.

An introductory quotation from Charles W. Elliot represents the ruling idea in preparing this city planning report: "Good planning for cities and closely built towns and villages is not primarily a matter of aesthetics but of economics." In the report itself the author says: "Many plans for cities have miscarried and failed of accomplishment because of their impracticability. The first consideration in city planning should be economic, and then the aesthetic; not the reverse, as has been the case in many elaborate plans prepared for other cities, wholly impossible of accomplishment from the economic standpoint." (The writer believes that fully half of the reports on city planning that have been prepared and elaborately published at great expense during the past fifteen years have not been and never will be carried out, but have on the contrary made the taxpayers and average citizens suspicious of anything bearing the name of city planning.)

THE STREET SYSTEM.

Beginning with the idea that the first thought should be the laying out of the city so as to save time and money to the citizens and property owners and increase the convenience, comfort, speed and economy with which they can go from their homes to places of business or recreation, he presents the advantages of a few diagonal streets wisely located, of adjusting street widths to the relative demands, and of adopting sizes of blocks with a view to health, comfort and the elimination of undesired or improperly used areas of building plots. The principles and arguments presented make no claim for originality, but are undoubtedly new to the majority of average citizens although it is of the greatest importance that they should know and appreciate them.

As general standards (to be modified by circumstances

in individual cases), Mr. Sawistowsky recommends as widths for three general classes of streets:

For Main Thoroughfares or Trafficways.

Double street car tracks.....	20 feet
4 lines of vehicles, 2 on each side of the tracks, 9 feet each.....	36 "
12 lines of pedestrians, 6 on either sidewalk, 2 feet each.....	24 "
Total	80 "

Secondary Thoroughfares.

Single car track.....	8 feet
4 lines of vehicles, 2 on either side of track, 8 feet each.....	32 "
8-foot sidewalk and 2-foot grass space on each side.....	20 "
Total	60 "

Residential Streets (Minor).

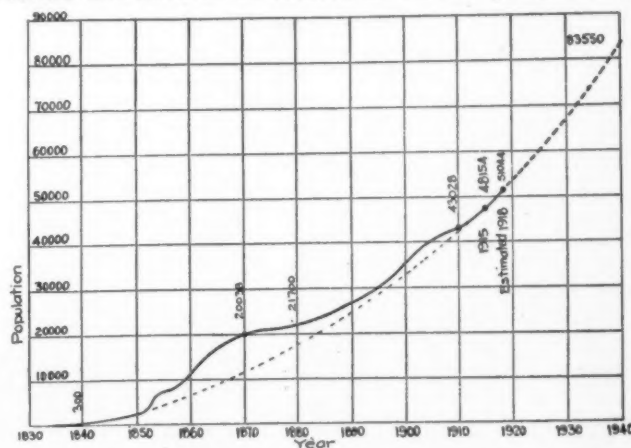
3 lines of vehicles, 8 feet each.....	24 feet
13-foot boulevard on each side, including side- walks	26 "
Total	50 "

With these general ideas as a basis, a street plan was prepared for a considerable territory lying north, north-west and north-east of the present city limits as well as for some small undeveloped areas within such limits. Within the city there is proposed the cutting through of one long diagonal street about $1\frac{1}{2}$ miles long and a few minor street extensions, adjustments and widenings. Aside from a few diagonals, the new street lay-out is largely rectangular, except that in the northern part, where the ground is cut up by ravines, an irregular lay-out is made adapted to the topography.

"There are several large draws, or ravines, draining from the north to Duck creek. There is running water in them practically the year 'round, and to destroy this natural scenic beauty by the construction of large and costly storm drains would be unwise. Main traffic streets are proposed in these draws, providing easy grades for all vehicles and the maximum development of the land for residential purposes.

"One of the prettiest examples of this type of development is the Country Club district of Kansas City. The creek lies to one side of the paving and is spanned by small foot bridges for pedestrians and at all street intersections by artistic concrete or stone arch bridges."

If the street layout proposed for the new territory is adopted by the city council, any street through this section will have to be located as on this plan, and the



POPULATION CURVE OF DAVENPORT.

council can then demand that the streets and alleys be graded to the established grade before accepting them, which alone would save the city hundreds of thousands of dollars. The city, however, has not the power to prevent a land owner from erecting buildings within the lines of the platted but unopened streets, and must then purchase or condemn such buildings in order to put through any street the site of which they may occupy, unless through amendments of the state constitution the city be relieved from the necessity of paying damages for buildings that may interfere with the carrying out of street plans made and adopted prior to the erection of such buildings. The author quotes the Pennsylvania Act of 1891, which has been repeatedly upheld by the State Supreme Court and the United States District Court, which grants such authority to the cities of that state.

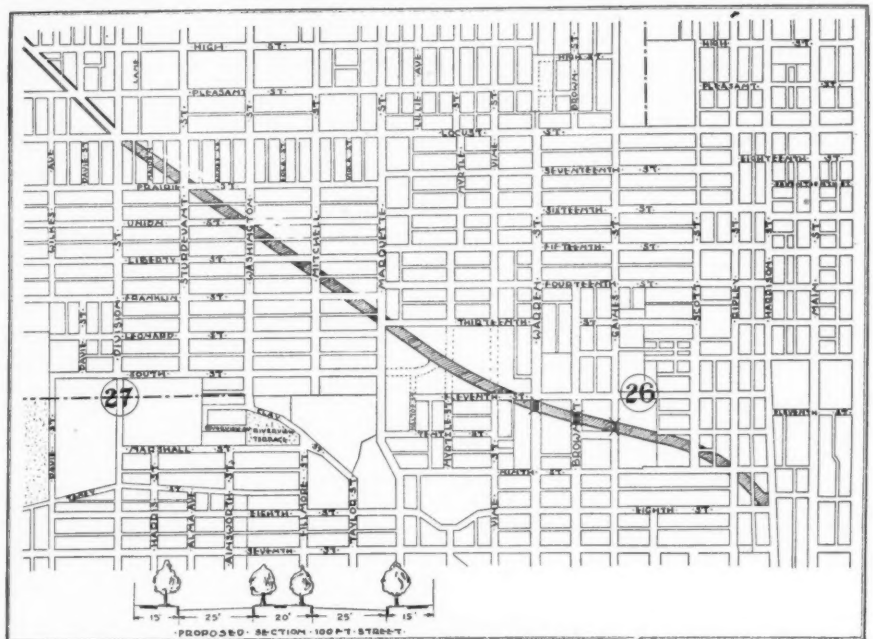
The diagonal thoroughfare planned to be opened in the existing street layout of the city is shown in the accompanying drawing, this diagonal lying in a deep ravine and offering an easy grade of not more than four per cent. The property immediately adjacent to this ravine is well built up, but fortunately no important improvements have been made in the ravine itself. The cost of carrying through this plan, therefore, would be very much less than has been the case in a number of cities where diagonals have been cut through the built-up sections, and the author of the report believes that the expense would be justified by the saving of time to the people using it, as the distance so saved would be more than one-half of a mile.

In planning the streets in the annexed territory, the north and south streets leading toward the town are placed closer together than the east and west streets, since more traffic will travel in the former direction. Where possible, the north and south streets are spaced 16 to the mile and the east and west streets 8 to the mile; thus, when 60-foot streets are provided, giving blocks of 270 feet by 600 feet, which, with a 20-foot alley through the center longitudinally, gives a lot depth of 125 feet. As far as possible, streets in the hilly section will run at right angles to the contours rather than parallel, since the latter gives poor building sites, the lots on one side being too high above and those on the

other side too much below the street level; but where streets run at right angles to the contours, lots opposite each other will have approximately the same elevation and with a little leveling provide very desirable building sites, each house being a little higher than its neighbor and the properties being separated by terraces.

SIZES OF BUILDING LOTS.

Concerning size of building lots, the report says, "It is highly desirable that a standard minimum size of lots be adopted for residence properties. The evils arising from the platting of lots 20 and 25 feet wide are apparent at a glance. . . . The street will be most attractive where the space between houses is sufficient to give plenty of light and air and provide ample room for simple planting. It is highly desirable, therefore, that if the size of lots is to be decreased, it should be done by shortening the depth of the lot and not the width. The width of lot

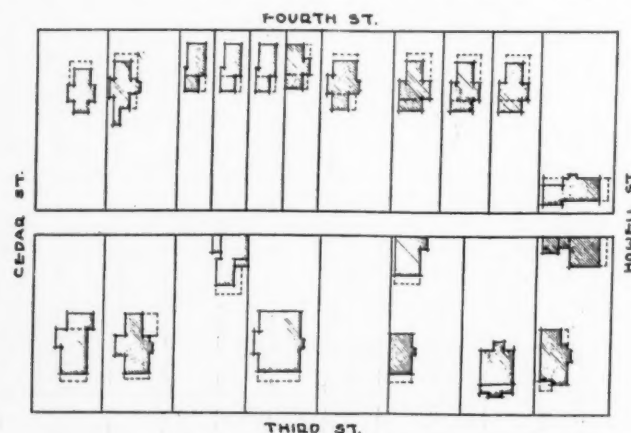


PROPOSED DIAGONAL TRAFFIC WAY.
Extension of Hickory Grove Road to Business center.

should be not less than 45 feet, and preferably 50 feet or more, and the depth not less than 100 feet. The recommended minimum standard size for lots is 50 feet by 100 feet. The size of lots in the "Highlands" addition is 50x125. This is a splendid type of development for the workingman's home. Statistics compiled of 16 cities in various parts of the United States show that the sizes of lots vary all the way from 15x50 feet, as the average for Philadelphia, to 200x200 for Syracuse. The general tendencies for most of the cities was an average lot 50x150.

"Where the lots are too long, the tendency is to erect houses on the rear of the lot, fronting on the alley. . . . Buildings in the rear tend toward congestion and improper health conditions. The only remedy is to make the lots shorter so that the amount of money invested in land and improvements will be less. There should be lots available for the workingman who cannot afford to buy a large lot to build his cottage on.

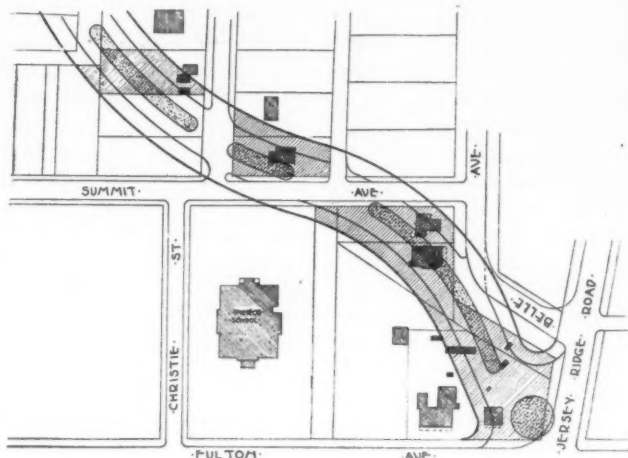
"The building of a cheaper class of dwelling on the alleys causes an unsanitary condition of affairs that is not only prejudicial to the physical but to the moral health of localities in which it exists. The shortening of lots will no doubt have a tendency to widen them without unduly increasing the cost of the land. More streets for frontage combined with fewer and narrower cross con-



DAVENPORT BLOCK, SHOWING HOUSES ON ALLEY IN DEEP LOTS.

recting streets would enable the land owner to do this without burden on the purchaser and we would have districts that would more nearly retain their value."

The building of houses on alleys, when the lots are of the desirable area referred to, would be prevented by limiting the percentage of the lot that residences can



CONTINUATION OF KIRKWOOD BOULEVARD.

cover; reference being made to New York where, in the residential sections, not more than 30 per cent of a lot can be covered by buildings above a point 18 feet above the curb, nor more than 50 per cent below this elevation.

SET-BACK OR BUILDING LINES.

The report recommends the obtaining of power by the city to establish building lines on streets in order to permit the future widening of streets at a minimum cost and also to prevent injustice being done to owners of residences who cannot now prevent a single owner from placing a building in front of a generally agreed upon building line and thus injuring the property of an entire block.

With such lines adopted, owners must locate their buildings a prescribed distance back from the street line, although they may use the fronts of their lots for any other legitimate purpose except building upon them. In private residence sections a uniform setback from the street line increases the attractiveness and adds to the health and comfort of the residents, providing abundant light and air, making possible lawns and shade trees in front, and removing the dwellings from the noise, fumes and dust of the street. The setback distance would probably differ in different streets and a study should be made of the ultimate class of buildings in each block or district before establishing such lines.

Local residence streets that have a building line can be given a narrower width for the street itself than could otherwise be permitted, thus reducing development expenses by reducing the amount of land taken and also the outlay for paving. Thus a 60-foot street might be reduced to 40 feet with a 10-foot setback on each side, which the author says might be adequate for streets 800 feet long if developed with single-family houses. If later these houses were replaced with three-story or four-story apartments, the street could be widened to 60 feet to meet the increased traffic requirements caused by the intensive housing.

BUILDING ZONES.

It is also recommended that power be obtained from the state legislature to establish building districts or zones. Berkeley, California, is reported to have passed



VIEW OF PART OF KIRKWOOD BOULEVARD.

recently a district ordinance whereby the city might be divided into districts in some of which it might be lawful to construct or maintain certain buildings, or carry on certain trades or callings, which shall be unlawful in other districts. This city has defined 27 different classifications of buildings and industrial districts.

The last General Assembly of Iowa enacted a law giving cities of the third class authority to establish a restricted residence district upon petition of 60 per cent of the property owners residing in said district. Advantage of this act was taken in Davenport recently when an oil company was contemplating erecting an automobile filling station on one of the main residence streets, the property owners petitioning that their street be established as a restricted residence district, which was done, and the oil company prevented from carrying out its plans. According to this law, the restrictions can be set aside at any future time when the growth of the city should demand it, upon petition of 60 per cent of the property owners.

EXCESS CONDEMNATION.

Several pages are devoted to a discussion of the matter of excess condemnation, Mr. Sawistowsky believing that power of excess condemnation is very desirable for Davenport. "New York, Massachusetts, Pennsylvania, Maryland, Ohio and Virginia have statutes permitting the exercises of this power. Hartford has incorporated a clause in her new charter authorizing the practice. In Wisconsin, cities of the first class have the right to purchase excess land, but not to acquire it by condemnation proceedings."

OTHER FEATURES.

Concerning the establishment of a so-called civic center or the grouping of public buildings, practically no plans were made for this, since the present city, county and federal buildings are of ample size for many years to come and the construction of new ones is not contemplated or probable. Several special features are considered and recommended, such as a bathing beach along the river front, another bridge connecting the city



BUILDING PROJECTING BEYOND GENERAL BUILDING LINE INJURES ALL PROPERTY ON THE BLOCK.

with the city of Rock Island, the establishing and gradual development of a parkway along a stream that separates the present city from the territory to the north into which it must extend, the creating of a park on a large island in the river in front of the city (which is already under way), and the establishing of a few small parks in sections of the city where it now is necessary to walk more than a half mile to reach such a park. The report concludes with a proposed law authorizing the establishment of building lines, a proposed constitutional amendment granting power of excess condemnation, another authorizing the creation of a city plan commission, and the text of the act of the Iowa state legislature authorizing restricted residence districts in cities.

WATER WORKS OPERATION

Determining Total Consumption in a System— Learning Whether Amount Indicates Waste or Leakage.

The making of a general investigation as to whether there is any considerable waste in a city as a whole consists of two general processes, one being the determination of the actual consumption, preferably recorded for each hour of both day and night, and the other the calculation, on the basis of this, of the probable amount which may be considered as unnecessary use or leakage.

The simplest and most reliable method of determining the total amount of water entering the system is to place a master meter in each supply main, sufficiently near to the reservoir, pump, or other medium through which the water is supplied, to eliminate any appreciable loss of water between such medium and the meter. Since these mains are ordinarily quite large, the Venturi meter is the type ordinarily employed for this purpose, although quite a number of water works systems are provided with large meters of other types. In some cases it is possible to measure the flow by requiring all of it to pass over a weir on its way from the reservoir to the supply main.

Where the supply is pumped, it is commonly assumed that a certain amount of water is delivered with each stroke of the pump, and the number of strokes being recorded by a pump counter, the amount pumped is calculated on this basis. Unfortunately, all pumps gradually deliver less and less water per stroke as wear, obstructions in valves and other results of operation increase the amount of slip. There is some slip in even the most perfect new pump, while that in an old pump in poor condition may amount to 50 per cent of the pumpage indicated; and yet a number of superintendents report the water consumption of their cities on the basis of pump delivery, in the calculating of which they make no allowance for slip. There can be no question that the only wise plan is to provide a meter or some other appliance for measuring the water that can be relied upon. One great advantage of this in the case of a pumped supply is that the meter record compared with the pump counter calculation will show the amount of slip in the pumps. Slip means energy wasted in the pump, and it should be corrected when it exceeds about six or eight per cent (less for higher efficiency pumps and possibly more may be permitted for those of low efficiency). The discovery of slip followed by its remedy will thus permit an elimination of waste of fuel that will of itself ordinarily justify the installing of the meter.

For a large city, where its cost forms a less appreciable

part of the financial statement of the plant and the amounts of waste involved are larger it is desirable to have a self-registering attachment on the meter; but for small plants this probably would not be warranted. Where the meter is not self-registering, a record should be kept of the reading each night and morning, and of the night consumption and day consumption so indicated. Any considerable sudden jump in either will then be known at once and can be investigated.

If neither meter nor weir is available, it is still possible in many cases to determine the consumption quite approximately, especially the night consumption, which is the most important in determining waste. If a pumping system is provided with a distributing reservoir or standpipe, the pumps can be shut down and all consumption drawn from the reservoir or the standpipe, and the amount so withdrawn calculated from the amount of drop of the water surface. In the case of the standpipe, this can be calculated exactly from the horizontal area, which is practically uniform throughout, there being no leakage. (If the exact area is not known, it can be obtained with sufficient exactness by measuring the outside circumference of the standpipe or tank and dividing the square of this circumference by 12.5664.)

The fall in surface may be calculated from pressure gauge readings, especially if it amounts to more than 10 or 15 feet and only a fairly accurate knowledge of the amount of consumption is desired. But for accurate determinations a float and indicator should be used. One that will serve temporarily for summer use can be made very simply by using two small pulleys, a piece of flexible wire (or strong braided waterproof fish line) a little longer than the standpipe is high, a float attached to one end of the wire and a counterweight to the other. A plank about 5 feet long is attached in a horizontal position to the top of the tank close to the ladder, with a pulley at each end, the wire passing through the pulleys and carrying the float on the end that overhangs inside the tank and the counterweight on the end that hangs outside the tank. The horizontal plank is so adjusted in position that the counterweight hangs near one side of the ladder, on which a tape is attached, or near a scale painted or fastened on the side of the tank. The counterweight carries a pointer whose position on the scale indicates that of the float and water surface on the inside.

If the consumption is measured by fall of water level in a reservoir, such measurement can hardly be so accurate as in the case of a standpipe, for two reasons—the sides of the reservoir are more or less irregular in surface, and there is probably more or less seepage or leakage. Before using the reservoir for this purpose, the rate of leakage at different stages of water level should be determined. For this purpose, the outlet valves should all be closed tight (their tightness being ascertained and not assumed), with the reservoir practically full, and the fall in the surface level during 24 hours carefully measured by a hook gauge or level and rod, no inflow of water being permitted meantime. The water is then drawn down not more than one quarter the depth and a similar test made, and this repeated with one-half and one-fourth full depth. If irregularities are noted, indicating that there is a special point of leakage above the lowest level tested, this point should be found and the rate of leakage just above and just below it ascertained.

Careful measurements should be made of the area of water surface in the reservoir at various stages of the

water within the range through which it will travel during the waste investigation. This is generally done by running a transit line around the reservoir close to the edge and measuring offsets at close intervals to the edge of the water. During any set of measurements, the level of the water should be read at say 15-minute intervals, and the time of each measurement noted, so that allowance can be made for differences in elevation of the water surface when the different offsets of a given set of readings were taken. A complete set of offsets around the reservoir should be taken at vertical intervals of one to five feet, depending upon the regularity of the slope, the accuracy desired, etc. Generally it is best to combine this measurement and the leakage test, keeping the outlet closed during each set of measurements of water area.

Having made the above determinations, the consumption during any night or day, series of hours or other period can be determined by drawing all the consumption from the standpipe, tank or reservoir, admitting no inflow of water to it meantime, and noting the drop in water level. For a standpipe with its small area, the float and indicator described may be used; but for a reservoir, the fall is so slight that a more accurate method should be employed. Probably the best is a hook gauge, set rigidly in a screen chamber or other structure connected with the reservoir in which the water is not disturbed by wind or other influences. (The hook gauge consists of a hook of brass, bronze or steel, shaped like a fish hook, and fastened at the end of a rod with the hook pointing upward, the rod being made to slide vertically beside a scale graduated generally to tenths and hundredths of a foot, the rod carrying an index mark or pointer, or a vernier by which thousandths of a foot can be read. The rod is moved slowly by means of a screw attached at the top. The hook is lowered until the point is below the water, then raised slowly until the point just raises a "pimple" in the "skin" of the water, when the reading is taken.) Or an appliance operated by clockwork and employing a float resting on still water may be purchased or made, by which a pen is made to register continuously the level of the water.

If there is no meter in the main just outside the pumping station or reservoir to measure the entire consumption, a pitometer can be installed there at relatively small cost, by which a continuous record of the consumption can be obtained. This will generally give more accurate information than that secured by measuring the reservoir and noting water levels, and it is not necessary to interfere at any time with the operation of the system in order to apply it.

If more than one source of supply serves the system, as two reservoirs or a reservoir and a pumping plant, of course either the flow from both must be measured or one of them shut off by a valve that does not leak. If the reservoir receives the surplus of the pump's supply and makes up the deficiency (the direct-indirect system) the reservoir surface may rise at night and during other hours of low consumption, in which case the quantity added to the reservoir must be deducted from the total pumped during the same period in order to obtain the consumption. Also the sum of pumpage and amount drawn from reservoir must be taken to find the day consumption.

Having determined the total amount consumed during a certain period (24 hours, or between 1 or 2 and 5 A. M., are commonly used periods), the problem then is to judge whether this amount is such as to justify a belief that there is waste or leakage sufficient to warrant a detailed investigation. This will be considered next week.

ELECTRIC PUMPING FOR MUNICIPAL WATER WORKS

Comparison with Other Forms of Power on Basis of Cost, Durability and Reliability—Characteristics of Pumps—Choice of Pump.

COMPARISONS OF ELECTRICITY AND OTHER FORMS OF POWER.

The same points should be considered when one is choosing power for pumping as when choosing type of pump—first cost, length of useful life, reliability, and total cost of operation.

Steam, gasoline, and oil engines are all competitors of the electric motor.

First cost means high fixed charges, which should always be included in the total pumping cost. Power plants are arranged in the following order as to first cost: Steam (high), oil, gasoline, electric motor (low).

Steam pumps and pumping engines and electric motors are likely to have a longer useful life than oil and gasoline engines.

Steam power is generally considered the most reliable of all types of power. Electric power is sometimes placed second, not because the motor itself is inferior to the steam plant, but because the motor must depend upon the electric central station and connecting lines. Gasoline engines require less skillful attention than oil engines and for that reason are more reliable.

Comparative total costs of operation with different types of power offer a subject for debate. But the true answer depends largely upon the amount of power required and upon other conditions.

When the costs of fuel only are compared with the cost of electricity, the high-efficiency oil engine takes the lead. Except for small plants, coal costs are lower than gasoline costs. Cost of electric current per 1,000 gallons of water pumped depends partly upon the rate per kilowatt-hour. For large plants it is often higher than coal cost and for moderate sized plants it is likely to be higher than fuel cost for an oil engine.

Fuel costs comprise only part of the total cost of operation by engines. In general the different kinds of power may be arranged as follows in reference to total cost of attendance, lubrication, and repairs: Steam (high), oil, gasoline, electric (low).

Electric pumps are adaptable to remote and automatic control and thus may effect a big saving in operating expense.

A careful study and analysis of the average problem indicates that, with a reasonable rate for current, pumping by electricity results in a lower total of fixed charges and operating expenses than does pumping by any type of engine.

ELECTRIC PUMPING COSTS.

A summary of pumping plant data collected from operating records results in the following averages and ranges:

	Average.	Approximate Range.
Single-Stage Pumping:		
Daily pumpage, gallons.....	260,000	40,000-1,000,000
Total head or lift, feet.....	155	14-305
Kw-hrs. per 1000 gals. (18 plants)	1.08	0.50-1.82
Rate in cents per kw-hr.....	3.58	1.5-6.0
Double-Stage Pumping:		
Daily pumpage, gallons.....	66,000	25,000-135,000
Total head or lift, feet.....	300	150-525
Kw-hrs. per 1000 gals. (6 plants)...	4.39	1.16-9.00
Rate in cents per kw-hr.....	3.15	1.7-5.0

From the wide range of kw-hrs. per 1,000 gallons (0.50 to 9.00) and of rates per kw-hr. (1.5c. to 6.0c.), it is evident that the cost of current per 1,000 gallons has a very

wide range. The individual reports showed this cost to range from 1.25c to 15.0c, with an approximate average of 5.3c.

The higher costs are in cases of two-stage pumping when the air-lift is used for the first stage. In fact, four out of the six two-stage plants included in the tabulation given above employed the air-lift.

Cost of attendance, lubrication, and maintenance for electric pumping cannot well be summarized for the general case, but it is usually a small fraction of the cost of power.

Fixed charges on the pumping machinery are also usually less than the cost of power. But fixed charges at say 10 per cent on the total water works investment constitute a very large part of the cost of water delivered to consumers.

Only in exceptional cases does the municipality receive sufficient revenue from the sale of water to pay all operating expenses and legitimate fixed charges. A large part of the waterworks investment is due to fire protection and provisions for other public uses of water. Consequently it is appropriate that part of the costs be paid by general taxation.

CHARACTERISTICS OF VARIOUS TYPES OF PUMPS.

For ordinary deep-well pumping, when the outside casing is not over 8 or 10 inches in diameter, the reciprocating pump is most common. It is comparatively economical in power consumption for the smaller sizes, and the low speed at which it is run tends to obviate injurious vibrations and excessive wear. Valves require attention at intervals. To insure successful operation, the inside casing must be plumb and the water must be fairly free from gritty substances. Displacement capacity of the reciprocating pump is determined by bore, stroke, and type of the cylinder and by speed. When water is delivered on the upward stroke only, the speed is necessarily low. Double-acting, double-stroke, and differential-plunger pumps with a cylinder having a 6-inch bore and a 24-inch stroke allow speed up to thirty or more complete strokes per minute.

Centrifugal deep-well pumps with vertical shafts are made for well casings whose inside diameter is not less than ten or twelve inches, and are in general suited to low heads and large discharges as compared to the reciprocating pumps. The centrifugal pump has no valves to repair, but bearings both above and below the ground surface are subject to wear. The runner vanes and other parts struck by the high velocity water may be subject to rapid wear if the water contains injurious solids or compounds in solution.

The propeller deep-well pump with a vertical shaft is made for smaller well casings and for lower heads than is the centrifugal pump. Its chief advantage seems to be a large capacity in a small well casing. One company which makes both types rates the propeller pump at 2,000 gallons per minute from a well of 12 inches inside diameter and the centrifugal pump at 400 gallons per minute from a well of the same size. The shafts of both propeller and centrifugal pumps run at high speeds and require true alignment to prevent excessive vibration and wear.

The air-lift installation has an advantage over other deep-well pumps in that all moving machinery is on the surface and is more accessible for lubrication, adjustment and repairs. A number of wells can be pumped by air from one compressor. In some cases an advantage is gained by the aeration and cooling effect from the expanding air mixed with the rising water. The air-lift is especially adapted to pumping sandy and chemically impure water. It is also less affected than other pumps

by certain unfavorable conditions, as for instance a well casing out of plumb.

The air-lift is often employed where the water level is far below the surface, and where extra heavy pump rods would be necessary to insure sufficient strength and stiffness for a reciprocating pump. One catalog has stated that the air-lift "will deliver a greater quantity of fluid from a deep drill-hole than any other method of pumping." A later catalog from another company states that its propeller pump "will furnish a larger amount of water from a well of given diameter than any other known type of pump."

A well, to be equipped with an air-lift, must extend considerably below the water level, during operation, in order to afford sufficient submergence for the air and delivery pipes. According to one authority, the economical submergence is from 55 per cent to 80 per cent of the elevation between the lower end of the piping and the point of discharge above the surface.

Except for low heads, the single-acting plunger pump is most commonly employed for surface work. It is practically always built as a vertical-cylinder, triplex pump, which gives a very nearly steady flow of water. The plungers are easily inspected and it is a comparatively simple matter to renew the packing. This type is better adapted to handling water with gritty matter than is the piston pump, as the water in the cylinder is below the plunger. Plunger pumps are made for moderate and very high heads and for a great range of discharge capacities.

The double-acting piston pump may be considered as the "power" development of the water end of the direct-acting steam pump. The piston pump has less weight and size for a given capacity than the plunger pump and offers the advantage of compactness, especially for horizontal duplex and as a vertical triplex pump, as well as in other forms.

For low heads and large discharge capacities, the surface centrifugal pump is especially favored. It is also built for high heads (multi-stage) and for small capacities. This type of pump offers the advantages of low first cost, economy in space and weight, absence of valves and reciprocating parts, and ability to pass some solid material. The necessary high speed requires accurate balance and frequent attention to bearings. The action of the centrifugal pump depends upon such scientific laws, that a drop from the proper speed with a certain head means a greater drop in capacity than would result with a type of more positive action.

The rotary pump has not yet found much employment for city pumping. Its chief weakness seems to be its inability to stand up under unfavorable conditions. It has been especially subject to wear when the water contains gritty matter. A new style, which may prove more successful, is now being developed for town and city service. Positive force and delivery, without reciprocating motion, and a fairly constant efficiency under changing conditions are the principal advantages of the rotary pump. One manufacturer makes them for capacities up to 175 gallons per minute and for heads up to 115 feet; another makes them for capacities up to 1,050 gallons per minute and for heads up to 460 feet.

Centrifugal pumps possess the advantage over pumps of positive action in that the discharge can be closed, while operation is continued, without wrecking the pump. A centrifugal pump for instance will run with less power under full head and speed when the discharge is zero than when the discharge is normal. It is a measure of safety to provide the discharge pipe of a positive acting pump with a relief or safety valve.

For pumping from pits and open deep wells, centrifugal pumps are made with vertical shafts, and triplex pumps are made with long rods.

Another important characteristic of a pump is its mechanical efficiency, or the ratio of horsepower output to horsepower input. This efficiency is always below 100 per cent, because part of the power delivered to the pump pulley, gear, or shaft, is lost in bearing and water friction and cannot be included in the water power output of the pump.

A pump of positive action, such as a reciprocating or rotary pump, may generally be expected to yield higher efficiency than other types, except possibly for low heads. Additional losses occur in centrifugal and propeller pumps on account of the high-speed "churning" action upon the water. Thermodynamic losses from compressed air cut down the efficiency of the air-lift system.

In general, efficiency increases with increase of head or delivery or with both, but there are likely to be points in changes of head and delivery at which one type of pump will take the lead away from some other type.

Makers' ratings are generally for favorable conditions. After a pump has been in service for some time, more friction or slip may develop and materially lower the efficiency. On the other hand, a pump in service may exceed its rated efficiency.

Reciprocating pumps maintain a fairly constant efficiency under variations in head and speed. A large triplex pump under the best conditions may reach 80 per cent. In many plants the actual value is materially below 80 per cent.

Rotary pumps are similar to reciprocating pumps in maintaining efficiency under varying conditions; its maximum value may approach that of reciprocating pumps.

Centrifugal surface pumps very rarely reach an efficiency as high as 70 per cent, and that only when a very large flow of water is involved. The average efficiency in actual operation is often considerably below the possible maximum because the efficiency falls off rapidly when the head changes from that for which the pump is speeded.

The efficiency of a propeller deep-well pump is generally considered to be lower than that of the centrifugal deep-well pump. According to the catalog of one company which makes both types, the relative efficiencies are about three to two in favor of the centrifugal.

The air-lift is noted for its low efficiency. Efficiency here means ratio of power output in the water to power input to the compressor, and from 10 per cent to 25 per cent is about all that is realized in ordinary practice, although values as high as 35 per cent have been reported. Multi-stage compression, suitable for air cooling, and proper submergence with the right arrangement and sizes of pipes make for economy of power consumption.

On account of its low efficiency, the air-lift is seldom used except under specific conditions which would make other types of pumps unsuitable.

Only high speed pumps are made for direct shaft connection with electric motors. Because of their low speed, reciprocating power pumps are generally driven by a belt, chain, or gears from motors and engines.

Direct connection is, of course, most efficient of the four types of drives mentioned. Belt drive is fairly quiet, possesses flexibility, but requires considerable space. A tightener pulley permits a shorter belt but cuts down the efficiency. Gear drive is fairly efficient, requires a small space, but possesses very little flexibility, and is not recommended where silence is essential. Chain drive is suitable for transmission of much power at a slow speed, in less space than a belt occupies, and in places subject to undue heat and dampness. Well designed and

built chain and sprockets are more quiet than all-metal gears but if, from abuse, the chain links become distorted the drive will be noisy and inefficient.

THE CHOICE OF PUMP TYPE AND CAPACITY.

Reliability and net overall economy should determine the choice of pumping equipment. Economy depends upon both fixed charges and operating expenses.

To insure reliability the pump must be of proper type to fit the conditions, must be of ample capacity, must be well designed and stoutly constructed; and, when the extra investment is warranted, a reserve unit may be provided.

For fire protection, an additional pump is sometimes provided, or the service pump may be designed for a higher head than exists under ordinary service.

Operating expenses comprise mostly power, attendance, lubrication, and repair costs. High efficiency results directly in low power consumption. Within certain limits a larger pump will cut down the required attendance in a small town plant by making fewer hours of daily operation necessary. The cost of lubricant is not likely to be an important factor in choice of pump. The cost of repairs is highest when it is attempted to operate a pump under conditions for which it is not suited.

The type of pump is likely to affect the first cost of other equipment. For instance a deep-well centrifugal pump may require, to deliver the same flow, a larger well casing than would a propeller pump. Or a surface centrifugal pump may be directly connected to a high-speed motor while a reciprocating or rotary pump of the same capacity as the centrifugal would have to be belt or gear driven and would require a low-speed and more costly motor.

The question may come up as to whether it would be best to use a deep-well pump for forcing water into the stand pipe or service mains instead of allowing it to pump into a surface reservoir, from which point the water would be delivered into the mains by another pump. If the total head is not too great, better efficiency will usually be obtained by single-stage rather than by two-stage pumping. In a number of Iowa towns, water is successfully raised, by a single deep-well reciprocating pump, from 20, 30 or 40 feet below the surface and delivered into mains against about 100 feet of head.

Centrifugal and propeller deep-well pumps are sometimes provided with booster centrifugal pumps at the surface, mounted on the same shaft as the lower runners.

When the air-lift is used, however, it is generally found more economical to deliver the water into a surface reservoir and to perform the second stage of pumping by a more efficient type of pump.

Propeller pumps are designed for wells in which the water (during operation) is not more than 100 or 150 feet from the surface. The corresponding maximum head for centrifugal deep well pumps is about 200 feet. Reciprocating deep well pumps are made for lifts up to 500 feet, but a cylinder for such a pump is of small delivery capacity. Air-lifts have been installed for even greater heads. One authority recommends that when the air-lift is used for more than 180 feet of elevation, it would be more economical to use two or more air-lifts in series.

In choice of pump capacity, in gallons per minute, some of the primary deciding factors are the daily pumpage required, storage capacity, and the amount of continuous supply available. If the source of water is limited to a certain deep well, the capacity of pump may be limited by the diameter of the well casing.

Not only the average but also the maximum gallons required per day should be known approximately.

In case the supply is to come from a well or wells it is a wise precaution to test the source for maximum flow before choosing a permanent pump. If the supply is to come from a small stream or other source, possibly limited, it is well to know first what the minimum flow during the year will be.

Economy of operation should also have a voice in choosing the size of pump. Large pumping plants may find it economical to have one or more pumps at work practically all the time while other pumps are held in reserve. The small municipal water works with but one pump, in a town of say 1000 population or less, will operate more economically when the pump and storage are of such capacity that the pump need work only a few hours out of the twenty-four. The larger pump and motor or engine are more efficient than the very small unit, the machinery will last longer, less attendance is required, and more time is available for repairs in case of a break-down.

It is wise to choose a pump with a rating well above the actual flow desired. Ratings are usually based on cylinder displacement or upon quite favorable conditions. A new reciprocating pump may deliver from 5 per cent to 10 per cent less water than its cylinder displacement. After the same pump has been used for some time, it is likely to have more slip unless kept in very good repair.

FIRE PROTECTION

The question of fire protection is sometimes the deciding factor which determines whether municipal pumping is to be done by steam or electricity. Reliability is the one important requirement. When steam is adopted it is for one or both of two reasons—unreliable character of the electric current, and a greater faith in the steam pump than in the electric pump.

In case it is conceded that no available source of electric current can be depended upon for faithful service in all emergencies, it is indeed unwise to place trust in the electric pump. But with modern operation in moderate and large-size electric central stations, such a failing can seldom exist. It is a wise precaution to provide two power circuits to the electric fire pump. It seldom occurs that connections can be had with two independent generating plants, but two separate lines can be built from the one plant; more than one generating unit is usually available for fire service: If the generating station is in a distant city and is connected by but one transmission circuit, the most probable chance of possible failure will be in that one line.

Underwriter's direct-acting steam pumps are favored for fire protection because of their simplicity and their flexible yet positive action. They are made with large openings and are very stoutly constructed.

As a competitor of the steam fire pump, the electrically driven direct-connected multiple-stage centrifugal fire pump is offered by manufacturers of power pumps. It is especially designed and constructed to conform to requirements of the fire underwriters. Rated pressure heads usually range from 100 to 150 pounds per square inch. Rated capacities are from 500 to 1500 gallons per minute. These flows would supply from 2 to 6 fire streams, each stream of 250 gallons per minute.

The centrifugal fire pump is comparatively simple, and flexible in operation; yet it can be depended upon to deliver large volumes of water at high pressures. Its characteristics are such that the motor cannot be seriously overloaded, even with the discharge completely closed, or completely opened with no restraining pressure.

The above remarks refer to those systems where the stand pipe, water tower, or pressure tank does not provide sufficient pressure and capacity for fire protection, and where "fire pressure" must come directly from the pump. Most small towns having water towers depend upon stored pumpage and install no special fire pump. In many larger municipalities containing higher buildings and a wider territory, normal service storage and pressure are not sufficient for adequate fire protection.

The cost of operating a steam pump while fighting fire is not considered important. But the expense of keeping the boiler fire banked twenty-four hours per day, and fixed charges on the boiler investment, are very important and are very big items of cost in a town of moderate size where service pumping is done by other than steam power. In case the pumping plant is part of the electric central station, or is adjacent to it, steam-pump fire protection may be maintained at a reasonable cost by means of a steam pipe connection with the central station boilers.

SEWERS AND TYPHOID FEVER.

In the latest annual report of the New York State Board of Health, H. Burdett Cleveland, principal engineer of the Division of Sanitary Engineering, presents a discussion of the relation of sewerage systems to the prevalence of typhoid fever. In this he says: "The influence on typhoid fever death rates of the use of insanitary and inadequate methods of sewerage and excretal wastes disposal, except in respect to sewage contamination of public water supplies, has been little studied and rarely reduced to terms of abnormal death rates from this disease."

A study of the New York State data for twenty years was made to learn what influence adequate and sanitary disposal of the excretal wastes has on the typhoid fever death rate. As far as possible the cities compared were those where other factors in the causation of typhoid fever, such as badly polluted water supply, would not obscure or overshadow the influence of proper sewerage. Only those incorporated places having a population of 1,500 or over, whose water supply was known to be of good sanitary quality, whose milk supply had not been questioned and whose general sanitary conditions in other respects were considered good, were selected for purposes of comparison. The places compared had populations varying from 1,500 to 15,000.

A table was prepared giving the typhoid fever death rates for each of the twenty years from 1895 to 1915 of the municipalities with sewers and similar rates of those without sewers. During the first few years the figures from only 12 municipalities were available, the number gradually increasing until there were 54 during the last two years. Figures for the individual years do not always show the excess on the same side, some years showing a higher death rate for those with sewers than for those without. But the average of all the rates for the twenty years is 17.7 per hundred thousand for municipalities with sewers and 22.3 for those without sewers, or a 26 per cent excess of the unsewered over the sewered municipalities.

It is believed that if due allowance could be made for the effect of other conditions, such as milk and water, a considerably better showing could be made for the sewered cities, since the greatest differences in death rates were found between sewered and unsewered cities where the comparison was affected by such conditions. Since it seems almost impossible to make reliable allowances for such affecting conditions, however, such cities were excluded from those compared.

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SEWERAGE AND RIPARIAN RIGHTS.

A city of fifty thousand population discharges into its sewers in a day about four or five million gallons of foul water or sewage. What can it do with it? In a month it would fill a lake half a mile square and eight feet deep in the center—it cannot store it indefinitely; it is financially impracticable to send it into the air as vapor by means of heat or other methods of evaporation; except in the arid regions, no area of land available to any city could soak up this quantity indefinitely. There is but one solution—this water must ultimately find its way into the ocean, generally through the channel of existing streams. But riparian owners lower down on the stream object to this as interfering with their rights.

The legal question of riparian rights has always been a difficult one and its complications are increasing. The common law theory is that each user must pass on the water unimpaired in either quantity or quality. Practically this is impossible unless all use of the river is abandoned except that of turning water wheels and adding to the beauty of the scenery. No city could withdraw water from it for public use unless it returned it all as pure as it was originally. In a laboratory a glass of sewage can be changed to a glass of safe drinking water, but for a city to so purify its sewage is impossible.

The courts recognize this conflict of necessity with theoretical duties, and the common law has been modified accordingly; while state and federal legislation represents endeavor to strike a fair balance between the common law theory and common sense practice. Elsewhere in this issue is published the essence of a digest of the legal decisions on the subject which, together with a compilation of legislation relating to the subject, has been published by the U. S. Public Health Service.

FIRE FIGHTING A WAR NECESSITY.

Every fire in this country is an aid to the enemy, some fires indirectly only, but others directly by destroying food or ammunition intended for our soldiers or their comrades in arms from other countries. Fighting such fires is as necessary as fighting Huns. And providing equipment for fighting fires here is as essential as providing that required for fighting the enemy over there; in fact, the former is as important a part of the latter as the furnishing of naval convoys to prevent the destruction of war munitions by U-boats.

We believe, therefore, that there can be no question that the officials of cities, especially of those where are manufactured or stored food, ammunition, clothing or any other form of war munitions, should consider it obligatory upon them to maintain their fire departments at high efficiency, and even increase their efficiency. Fire apparatus, hose, and men should be adequate for any demands that may be made upon them; and the fire alarm system, without which these cannot be got to the fire during those first few minutes that are so vital, should be included in the preparedness program.

On the following page chief Ringer gives some suggestions on the saving of grain in mills and elevators from destruction by fire, and emphasizes the importance of automatic sprinklers and other means of combating fires before the department can reach them; and fully as important is the taking of all precautions against the starting of fires—the minimizing of fire risks. In securing these precautions, the firemen as inspectors have a duty as important as in extinguishing fires, and in this they should have the whole-hearted backing of the city officials and the courts in enacting and enforcing the necessary ordinances.

Fire fighting efficiency is as much a war necessity as farming. Cities are under even greater obligation to guard grain from destruction than the farmers are to raise it.

A FEDERAL COUNCIL TO CONTROL ROAD WORK.

All functions of Government agencies relating to streets and highways hereafter are to be coordinated in a body called the United States Highways Council, composed of one representative each from the War Department, the Department of Agriculture, the United States Railroad Administration, the War Industries Board, and the Fuel Administration. The council was formed primarily to prevent delays, financial loss, and uncertainty incident to the method of taking up each highway problem in its turn with a separate and distinct Government agency. This council was constituted at the suggestion of the Secretary of Agriculture. Through the department it will continue the close contact already established, both formally by law and informally by practice, with the State Highway Commission in each state of the Union.

The council consists of Lieut. Col. W. D. Uhler, representing the War Dept.; C. G. Sheffield, Fuel Administration; Richard L. Humphrey, War Industries Bd.; G. W. Kirtley, Railroad Administration; and Logan Waller Page, Office of Public Roads, Dept. of Agriculture. Mr. Page is chairman and J. E. Pennybacker, chief of management of that office, is secretary.

This council operates as a single agency where all highway projects calling for governmental action may be dealt with, whether for deciding questions of finance, materials, transportation, or of war necessity or desirability.

The council has provided a definite form on which applications for relief are to be made through the respective state highway departments, and has sent supplies of the forms to the departments. It emphasizes the great need of conservation of money, transportation, labor, and materials by restricting highway and street work to most essential needs. It ranks maintenance of existing streets and highways first, reconstruction of badly damaged streets and highways next, and it places last new construction justified only on account of vital war or economic necessity.

FIRES IN MILLS AND ELEVATORS.*

Suggestions for Preventing Them—Conclusions from Experiences in Minneapolis—Automatic Sprinklers and All Possible Precautions Necessary.

By C. W. RINGER.†

The following conclusions are derived from practical experience, by diagnosing the causes of actual fires, and I hope that they will be of some value in enabling fire chiefs to safeguard the food of which our soldiers, our allies, the unfortunate neutrals and conquered peoples are now in such pitiful need. The destruction of one of our terminal elevators, filled with grain, means that corresponding thousands of people must go hungry.

The causes of recorded fires come under two heads:

(1) Common, every-day causes of fires, being those of heating, lighting, power-upkeep, and the human element.

(2) Least important fire producers or hazard, such as new and untried types of machinery and devices for increase or refinement of production, which many times fail because of still being in the experimental stage, and sometimes are successful for purpose designed, but produce other conditions that are very objectionable from millers' standpoint.

I know of one special grinding machine which when installed and operated set the mill on fire, and after repeated trials was abandoned; and there are certain types of machines of the screenings-grinding class which should be in a separate and detached building from any mill or elevator. The necessity of mills equipped for grinding wheat to now grind barley or corn, brings into a mill a danger not heretofore serious, as this change needs careful watching until millers are as familiar with handling of these cereals as of wheat; in addition, mills grinding barley or corn can not be kept as free from dust.

The safeguarding of mills, I believe, should be done by systematic inspection of the common fire hazards. Written recommendations should be made in duplicate, one given to the manager or head miller and the other filed for the next inspector to check up. Only by such an inspection can quick results be obtained. The inspections should be made at least once a month or until the mill has lost its bad habits. Most of the fires in our mills are from the common hazards and practically all of our elevator fires can be assigned to this cause.

The question of dust is very important, as it is the originator of a large per cent of our fires. The last three fires in mills were caused by dust in radiators, dust in fan, and dust on live steam pipe lying against a brick wall with insufficient clearance to permit the dust to fall. Therefore, by inspection this dust hazard can be greatly reduced. The disastrous explosion from dust does not now exist in flour mills because of modern dust collector

systems, but there are small explosions in grinders and rolls caused by small foreign substances, such as metals and stones, going through the machines. These explosions or flashes travel through spouting and break out at cloth dust collectors, and in most cases will set the mill on fire in many places at the same time. Within the last two months, two of such fires have occurred in our largest mills.

Prevention of fires alone will never be a success, and in proportion to hazards covered, so must the fire extinguishing devices be multiplied and specialized. A flour mill, full of many hazards, all intensified by highly combustible dust, is usually destroyed unless the fire protection is well maintained. A recent fire in one of our largest mills emphasizes this more than a dozen hypothetical cases. A fire originated in a high-speed screenings grinder, owing to a defective bearing, was blown by the fans through metal and wood spouts and elevator legs from the top of the mill to the basement. The metal spouts became so hot as to set fire to the various floors and where touching other woodwork. The automatic sprinkler system worked satisfactorily, but only tended to localize the fire and could not extinguish it, because most of the fire was in spouts out of reach of sprinklers. Fire axes were used to chop open spouts; four private standpipes with 1½-inch hose and one 2½-inch hose were brought into play, thirty-six 2½-gallon chemical extinguishers and several 5-gallon chemical extinguishers were used, many water barrels were emptied and about a dozen Wagoner buckets also were emptied. The organization among the old and experienced millers working on the various floors answered the alarm of fire, the automatic sprinkler supervisory service called the public fire department, and had the fire protection not been efficient in every detail, or failed in any one of the above devices, this mill would certainly have been destroyed. Every piece of fire protection device was in use, and it seemed for a time that the fire could not be stopped, but efficiency and preparedness told. Had this been a dusty mill, there is no question but it would have been totally destroyed. The value of the property was over a million dollars and the fire loss nominal.

After an alarm of fire from a mill or elevator without automatic sprinklers, the building is usually so far gone before the fire department arrives as to be of little service except to confine the fire to the premises; therefore it is now recognized that the most important prevention or protection device is to install an automatic sprinkler system in all mills and elevators of ordinary or fireproof construction, excepting concrete storage tanks without cleaning machinery. In addition to the sprinkler system, which in itself is not sufficient, standpipe and hose, chemicals, fire axes, water barrels and pails, watchman with some means of recording his rounds, fire department call boxes and automatic fire alarm with central station supervisory service, all should be installed.

There is no other class of manufacturing property in which the automatic sprinkler system is out of service or shut off for changes or accidental breakage so many times a year as in flour mills, and this makes regular inspection of all sprinkler controlling valves and water supplies very vital. Some mills have daily inspections by their own men, who make signed reports on the condition of sprinkler systems.

The two important factors, in my opinion, in the fire record of mills in the Northwest are: Inspection and Automatic Sprinkler Systems, and hand fire extinguishing apparatus. Our elevator record is not in comparison, and those which have burned lacked the standard automatic sprinkler system. Flour mills and elevators are of too rapid combustibility and too unwieldy to be left entirely to outside or city department protection.

*Paper before the International Association of Fire Engineers.

†Chief of Fire Department, Minneapolis, Minn.

The WEEK'S NEWS

Repairing New York City's Streets—No State Highway Census for Massachusetts This Year—Federal Government Urges Disease Notification—Beatrice, Neb., Gas Plant Closed When Higher Rate Refused—Pierre, S. D., Power Plant Burned—Fires in New York and Buffalo—California Utilities Commission Controls Power Production—U. S. Helps Fire Prevention Education—New Motor Apparatus—Grand Rapids' New City Manager—Philadelphia Cancels Contracts.

ROADS AND PAVEMENTS

Get Paving Blocks from Granite Wall.

San Francisco, Cal.—An unusual solution of a troublesome problem has resulted in a profit to the city instead of a loss. In removing the massive granite wall from around the old city hall, hauling the material to the dump would have cost \$2,000. It was decided instead to cut the rock into paving blocks about six inches deep, seven to eight inches long and three to four and one-half inches wide. The 75,000 excellent paving blocks obtained were produced at a cost of \$37.50 per 1,000, the work being done entirely by hand labor, at \$6 per day.

Neglected Streets of New York City.

New York, N. Y.—Street pavements in the borough of Manhattan are not in a condition to respond to the city's war-time needs. Streets in lower Manhattan, which have become the arteries of heavy war-time traffic, are suffering from years of inadequate upkeep and insufficient appropriation. Although the whole attention of the Bureau of Highways is now being given to the repavement of essential thoroughfares, over which the business of the city and the nation must pass, it is feared that \$700,000 will be lacking at the end of the year to complete the schedule of repaving now considered necessary, according to a statement made by Clifford M. Pinckney, chief engineer of the bureau of highways in Manhattan. The street pavements in this borough are worth to-day approximately \$35,000,000, he said, or just half what their value would have been if they had not been allowed to deteriorate. Barely to patch up this deterioration from year to year demanded the repaving of thirty miles annually, at a cost of \$3,000,000. To overcome the deterioration of past years, and bring the city to an efficient basis, would require the repaving of forty miles annually, with an appropriation of \$4,000,000 a year. The present appropriation for Manhattan, Mr. Pinckney said, was \$2,000,000, and for the entire city, only \$3,500,000. Blame for this condition should not be attached to any one individual or administration, Mr. Pinckney explained. The responsibility rested chiefly with various boards of estimate, he said, for their failure to make sufficient appropriations. Also the lack of fixed policy in regard to repavement and repair of streets had caused the deterioration from which the city suffers, he declared. Each administration, he added, had brought forward new ideas of what should be done with the streets.

"Under war-time conditions," said Mr. Pinckney, "we must apply all our two-million-dollar appropriation to work on the main thoroughfares, so that the essential channels of traffic may be put into condition. Side streets and less important thoroughfares must suffer, naturally, as our \$2,000,000 is hardly adequate to meet the pressing need. I expect a \$700,000 shortage at the end of the year, due to increased cost of materials, and even without this shortage it will be impossible to repair West street or South street, the two marginal ways. These marginal ways are in disgraceful condition, because the dock department, which exercised jurisdiction over them until a month ago, did not have a dollar for their maintenance. The borough president now has charge of them, but even he may have difficulty in obtaining money. Whether our emergency programme is completed depends partly on whether the Fuel Administration gives us asphalt and the Railroad Administration permits the shipment of ma-

terial." Mr. Pinckney explained that the conditions of streets in which subway construction was being carried on was the fault of subway contractors. "The moment the contract for a subway is let the street affected passes from our hands to the Public Service Commission," he said, "and we became responsible again only when the work is finished and the subway contractors have repaved the street. They have a custom of laying a temporary pavement for the use of the vehicles while the subway tunnel is settling. This temporary pavement is usually a disgraceful makeshift, from which the public has to suffer."

Skips State Road Census Because of War.

Boston, Mass.—Owing to war conditions the triennial road census of the state will not be taken this year, the highway commission, which has had charge of this work every three years since 1909, having decided that it would be extravagant to use for this purpose the services of a large number of people. The commission's regular force has been so depleted by the enlistment of a great many of its engineers that it is not in such shape that it could properly supervise the census, even if it were thought best to make the count. The road census is regarded as most desirable and even necessary under normal conditions, for it supplies to the commission and to all other road builders exceedingly valuable data as to the character of road that should be built in different sections and on the various routes. The data gathered in the three counts that have been made has contributed vitally to the improvement of the state's system of highways and has unquestionably prevented many expensive mistakes in type of road, that would have happened through using a kind of construction unsuited to the traffic it had to bear. In the census taken in 1915 the count was made at 192 stations scattered all over the Commonwealth. It was carried on for a week in August and for another week in October. The same plan was followed in 1909 and in 1912, though in 1909 there were 238 stations and in 1912, 156.

To make the count this year would require the services of nearly two hundred enumerators and it would take that number of people from other pursuits. To take the road census costs about \$10,000. It may be that if conditions change, the census will be taken next year, or it may go over until such time as there is a less urgent call for labor. The commission regrets having to abandon the work this year, mainly because of the tremendous increase in the use of the roads by motor trucks. It is believed that this increase is becoming so great that it will require the rebuilding of many of the state roads, which heretofore have stood up well under the traffic they were called upon to bear, but which will wear out rapidly under the constant traffic of big trucks putting a load of ten tons or more upon the road surface. Without the exact data supplied by a census the increase in this kind of traffic can only be estimated, but informal observations by division engineers will have to take the place of census figures. In 1909, when the first road census was undertaken, and which was one of the first if not actually the first count of its kind made in the United States, there was an average of 247 vehicles of all kinds per station and of this total 96 were motor vehicles and 151 horse-drawn vehicles. By 1912 the use of the roads had increased to 351 vehicles of all kinds per station per day. The motor vehicles had jumped to 222, a gain of 131 per cent and the horse-drawn vehicles had fallen off to 129, a

loss of 14 per cent. When the census of 1915 was taken it was found that the average use of the roads had advanced to 606 vehicles per day per station. The motor vehicles had increased to 500, a gain of 129 per cent, and the horse-drawn vehicles had dropped to 106, a loss of 18 per cent. For the six-year period from 1909 to 1915 traffic of all kinds gained 145 per cent. Motor vehicle traffic increased 420 per cent and horse-drawn traffic decreased 30 per cent. At some stations the 1915 count showed as many as 3,000 vehicles passing in a day. It is believed that if a census were taken this year it would show a still more notable gain in all traffic, attributable to the big increase in the number of motor vehicles which have just about doubled in numbers the past three years. When the 1909 census was taken motor trucks were a negligible quantity, and were not counted separately. By 1912, however, motor vehicles for commercial purposes had begun to be used so extensively that the census recorded an average of $11\frac{1}{2}$ a day at each of the 156 stations where the count was made. They formed, however, no more than three per cent of the total traffic. In the three years that followed trucks increased so that in the 1915 census they made up six per cent of the total traffic and averaged 38 per day for all the stations. They increased in these three years 230 per cent against 129 per cent for passenger motor cars. In 1915 there were less than 12,000 commercial motor vehicles in Massachusetts and comparatively little interstate traffic that brought in trucks from other sections. This year there will be nearly three times that number, if the present rate of increase over last year is maintained, and there is a very heavy traffic of long-distance, out-of-state trucks coming into Massachusetts daily. If a census were taken this summer, the commission believes that it would unquestionably show very close to an average of 100 trucks per day per station.

SEWERAGE AND SANITATION

City Wins Fight Over Disposal Plant Site.

Syracuse, N. Y.—According to a decision handed down by the appellate division, Syracuse wins its fight to abandon proceedings started in 1915 to acquire land on the west side of Onondaga lake for a sewage disposal plant. The appellate division has denied a motion for a reargument of the appeal to compel the city to go ahead with its acquisition of land. The court also denied the appellants the privilege of appealing to the Court of Appeals. In June, 1915, a commission was appointed to condemn certain lands and in March, 1916, the committee reported and gave the valuation of the land as \$17,161.73. The city thought the price exorbitant and dropped the proceedings. June 15, 1916, the owners of the land procured an order to compel the city to show cause why it should not go ahead with the acquisition of the property. At the same time the city obtained an order for leave to abandon the proceedings. The two orders were argued before justice Leonard C. Crouch in special term and the city won. The property owners appealed to the appellate division, which sustained justice Crouch.

U. S. Urges Disease Notification.

Washington, D. C.—The U. S. Public Health Service has sent the following letter to local health officers: "It is important for the protection of the health of the troops in camps that every community, no matter how small, report the presence of all communicable diseases, especially if present in epidemic proportions. Selected and enlisted men in traveling may be exposed to such diseases and carry them into camp. It is obvious that disease reporting depends primarily upon the doctors, but local health authorities should realize that the grave responsibility rests upon them of obtaining reports of all notifiable diseases from the doctors in their jurisdictions. In addition to rendering more complete reports under present regulations for reporting disease, it is highly desirable that physicians report immediately those cases where a selected or enlisted man has been so exposed to a communicable disease as to be a menace to any camp

or post in the United States. For this purpose the following plan of action is suggested by the United States Public Health Service after a conference with Army sanitary authorities:

1. The physician should make an immediate report to the local health authorities, who should notify (by telephone or telegraph if necessary) the senior medical officer of the camp or post to which the selected man or soldier may become a menace. A duplicate notification should be made by the local authorities to the State health authorities.
2. If there be no local health authority having jurisdiction, the physician should notify (by telephone or telegraph if necessary) the State health officer, who should notify (by telephone or telegraph if necessary) the senior medical officer of the camp or post to which the selected man or soldier is about to go.
3. The notification should be explicit, giving name of selected man or soldier and other identification data, together with his address and the nature of the disease.
4. The notification of the senior medical officer of the camp or post by the local or State health authorities should be in addition to the present procedure in such cases.

Health Board May Work Through Organizations.

Indianapolis, Ind.—The city board of health has a right to expend \$5,000 through the Children's Aid Association for the upkeep of infant welfare stations, judge Linn D. Hay, of superior court, has decided in denying an injunction sought in a suit brought against the association, the health board and other city officials. The injunction asked would have prevented the health board from paying the \$5,000 to the association. It was contended that the appropriation was illegal. "My only duty," said the opinion, "is to enjoin illegal appropriations and payments of money, if any, out of the funds already raised by taxation. The limitation upon the board of health in expending this money is upon the purpose for which it is used and not upon the means or agency by which or through which the object or purpose of the expenditure is attained. The discretion of the board within the spheres of their power, expressed or implied, for the sustaining of life, the protection of the health of the citizens of the city, the prevention of disease and the promotion of infant welfare is not subject to judicial control except in cases of fraud or where the power or discretion is being used, or is about to be grossly abused, to the oppression of the citizens. With this exception the responsibility of the judicious expenditure of moneys raised for this purpose is with the board. The most serious contention presented by the complaint is that the money is appropriated for and paid to the association, a private corporation, for its private purpose and gain. It must be conceded that the evidence does not sustain this contention." The city board of health for several years has had this arrangement with the Children's Aid Association.

WATER SUPPLY

Citizens Not to Vote on Water Works Purchase.

Bayonne, N. J.—The Supreme Court at Trenton has denied an application for a writ of mandamus requiring the Bayonne commissioners to call a special election for the purpose of determining whether or not the city should purchase for municipal purposes the water plant of the New York and New Jersey Water Company at an estimated cost of \$2,017,000. The commissioners adopted an ordinance with this end in view, but a citizen presented a petition, signed by the requisite number of voters, requesting the holding of a special election, under the provision of the Walsh act.

Supply Fails When Main Is Crushed.

Hood River, Ore.—The break of a main from the Tucker springs water supply furnishing about 1,000,000 gallons daily to Hood River, and the city's chief water supply, brought a temporary water famine here during the hottest days of the year. An official warning was issued, placing a ban on irrigation, and mayor Dumble, in order that sufficient water might be conserved from an old system for fire protection, appealed to the citizens to take as little water as possible for household uses. The main was crushed by the settling of an earth fill that is being thrown across the Indian creek gorge by J. G. Fairfowle, who is doing the work under a contract awarded by the county.

Water Supply Declared Adequate.

Hoboken, N. J.—Deciding that the Hackensack Water Company is equipped to furnish an adequate supply of water to Hoboken, except under the most abnormal conditions, such as prevailed last winter, the board of public utility commissioners at Trenton has handed down a decision dismissing the complaint filed in behalf of the city. The decision points out that in a previous proceeding brought by other municipalities served by the company an order was issued requiring the company to take steps to increase the pressure of its water service. Although Hoboken declined to become a party to these proceedings, the board stated, its service will be improved by the carrying out of the order.

Voters Approve Bonds for Water Supply.

Jacksonville, Ill.—The special election held here for the purpose of voting on the issuance of bonds in the sum of \$75,000 to erect a city water system carried by a vote of 2,706 to 547. It was the first bond issue to carry since 1869.

STREET LIGHTING AND POWER**Rate Increase Refused; Gas Plant Shuts Down.**

Beatrice, Neb.—More than 1,300 consumers of the local gas company were without light and fuel following the announcement of the company that it would shut down the plant unless granted an increase of 20 per cent in rates. The plant was shut down at midnight. A mass meeting of consumers, the city commissioners and officers of the company met during the evening in an endeavor to adjust differences. It was finally agreed that the plant be run three months and an audit made of the books to determine whether an advance is necessary. The company agreed to the request of the council, with the exception of a provision that in case they were making a profit without the advance they refund the increase. The commission remained firm and the company closed the plant. State fuel administrator Kennedy announced it was possible that some government agency would take over the plant in an endeavor to save coal.

State Commission Takes Over Power Production.

San Francisco, Cal.—Facing immediate power shortage for essential war industries, representatives of the power companies of northern and central California have made an agreement with the state railroad commission by which the commission practically assumes the administration of power production in these parts of the state. "A lowering of the streams by the rain shortage of the past season has lessened sources of waterpower to a serious extent, while the national crisis makes immediate and increasing demands for power," said the commission's announcement calling the conference. It was agreed that the utilities shall pool their power; that the commission shall prepare a priority list of consumers by which industries manufacturing articles not essential to the war shall be the last served; and that a representative committee shall work out a method of compensating some of the smaller power and power purchasing companies whose business is certain to be affected by the priority rules. The priority regulations will not be used until it is absolutely necessary, when, it was emphasized, railroads, ships, utilities and army and navy industries will first be served. Other consumers will be grouped under various classifications, those manufacturing war necessities to have the preference in being given power. While no agreement was reached, it was intimated strongly that electric signs may soon be tabooed—at least until the mountain rainfall increases—and that shopping after dark will be discouraged by the simple process of refusing electric lighting to the stores. The conference, it was brought out, developed as a result of an informal complaint to the commission by the Pacific Gas and Electric Company that it was not getting the power it had contracted for with the Great Western Company. Representatives of the Great Western explained how the light precipitation had interfered with their plans, and investigation brought out the fact that all

other power companies in this part of the state, with the possible exception of the Sierra and San Francisco, were in the same predicament, and that unless some remedy was found they would not only be unable to furnish the increased demands for power from the shipyards, powder factories and munitions plants, but could not take care of their established patrons. The commission, in order to handle the new functions, created a department of power administration, of which H. G. Butler, assistant chief engineer of the commission, was given charge. The cost of the power administration will be borne by the companies jointly. The first step toward the power pool agreed upon was taken when the Pacific Gas and Electric, the Northern California Power Company, Consolidated, and the California-Oregon Power Company signed a contract for interconnecting their lines. The work will entail an expenditure of approximately \$750,000, and may require sixty days before completion. The new arrangement will make it possible for San Francisco to use power generated over 300 miles away. It is expected that when the priority list is put out in the form of a state order, the companies will be absolved from liability under contracts with some of the smaller industries and power-purchasing companies that will be at the bottom of the list. "Passing judgment on who and who shall not receive power and on the adjustment of equities is one of the gravest duties the commission has ever been called on to exercise," said commissioner E. O. Edgerton. "It may mean death to some of the smaller power-purchasing and manufacturing firms." There was a strong intimation that if some of the smaller power-purchasing companies are financially paralyzed by the priority order, in having their best customers barred from receiving electrical energy, an appeal to the Federal courts will follow on the ground of confiscation. The Fuel Administration, Shipping Board and Food Administration representatives have offered their support to the commission in enforcing the order, however, and how far such an appeal would go is debatable among members of the commission, particularly as the order will be made as a war emergency measure.

Gas Rates Increased.

Muncie, Ind.—The Central Indiana Gas company, of this city, has been authorized, in an order from the public service commission, to increase its rates for natural gas to large consumers from 30 cents a thousand cubic feet to 35 cents for all over 5,000,000 cubic feet consumed in one month, and for artificial gas from 30 cents to 35 cents for all over 2,000,000 cubic feet of gas consumed.

Capitol Plant Supplies Service When City Plant Burns.

Pierre, S. D.—The state of South Dakota came to the rescue of its capital city, Pierre, when the destruction of the city's water and electric light plant by fire was relieved through the use of the electric light plant of the capitol building. The capitol electric plant is a direct current system, and the Pierre plant has been an alternating current, but through the use of a motor generator and the necessary equipment installed in the capitol plant, the city was supplied with light and electric power. The capitol plant can carry the load required and is of sufficient capacity to supply the city needs, and the capitol building, both using a moderate amount of electricity. By winter, when a fuller load would be required, with the legislative session on, and more lights needed by the city also, it is expected Pierre's new plant will be installed. The water situation will be relieved after a few days through the restoration of one of the city pumps, not sufficiently injured in the fire to make it unusable, and it was run by a couple of large steam tractors which were brought in from out in the country north of town. The town had one fire since the destruction of the plant, but it was at once brought under control through the use of the Rapid City chemical engine which had been brought over to Pierre the day after the plant burned here. Lack of water has caused great inconvenience, but no serious results, because a hand pump at the city wells enabled people to get a supply.

FIRE AND POLICE

U. S. to Teach Fire Prevention.

Washington, D. C.—Announcement has been made that the United States Bureau of Education and the National Board of Fire Underwriters have collaborated in a plan to enlist the interest of children in fire prevention. The board has been conducting an energetic campaign among business interests to reduce fire hazards since this country entered the war. Despite the progress made by this propaganda figures compiled by the board show that the losses by fire in 1917 amounted to \$250,000,000, or more than in any previous year since 1875 with the exception of 1907, the year of the San Francisco earthquake and conflagration. The federal Bureau of Education is sending to state and county superintendents and to local boards of education throughout the country copies of a ninety-one-page manual upon the subject, with the suggestion that it be made a regular textbook for use in the first half of the seventh grade work. This idea has been endorsed by many national and state officials. The booklet is entitled "Safe-guarding the Home Against Fire," with a sub-title, "A Fire Prevention Manual for the School Children of America." The manual was prepared by the national board, and contains very practical "don'ts" and "do's" in connection with all possible fire agencies. It is interestingly illustrated.

Whole Force Fights Difficult Furniture Blaze.

New York, N. Y.—The seven-story brick warehouse and factory of a furniture and carpet company was totally wrecked by fire and the damage to stock and building was estimated at \$150,000. It was one of the smokiest fires that the New York fire department has fought in years. The blaze sent up volumes of dense suffocating smoke that formed a pall extending across many blocks for several hours. Five alarms, mobilizing the entire Manhattan force, were sounded, the first at 4.30 p. m., and it was not until nearly 8 o'clock that the fire was under control. Twenty firemen were affected by the smoke, but remained at their task after being treated by ambulance surgeons. The fire started on the fourth floor among paints and varnishes, where fifteen employees were working, and quickly spread. A stiff breeze from the west fanned the blaze and the brewing company adjoining on the west and south was threatened for several hours. Hundreds of tenants in tenements east of the burning structure were driven out of their homes by the smoke. Many packed suitcases and took bedding, fearing a spreading conflagration. Three hours after the fire had been raging a V-shaped portion of the front wall from the fourth to the seventh floors collapsed, falling into the street, showering and disabling water tower No. 3, from which thirty firemen were compelled to jump to escape injury. One man sustained slight abrasions of the arms and face and was sent home. A cheer went up from the bystanders as fireman Joe Christie stood his post on the street with debris showering him and continued playing his hose on the fire. The firemen fought the blaze in relays, being unable to stay for any period in the dense smoke enshrouding the structure. Fire fighter after fire fighter collapsed to the pavement and was carried to safety by his comrades on the side streets and attended by a staff of physicians from neighboring hospitals.

Low Pressure; Fire Sweeps County Hospital.

Buffalo, N. Y.—Augmented by a brisk wind from the north and low water pressure, fire, which started from the explosion of a steam cylinder head under the pharmacy department, destroyed eight buildings at the Erie county home and hospital before it was brought under control, causing a loss of \$200,000 or more. There were no casualties, although there were 350 patients in the part of the hospital destroyed. Through the fine work of attendants and firemen, the patients were carried to safety before the flames reached them. The apparatus at the hospital was unable to cope with it, and Buffalo firemen were summoned. Fire chief McConnell of this city was soon on

the scene, and a second alarm was sent in, bringing a total of about fifteen companies to the fire. The hospital, which is located near the north city line is at a high elevation, and this made the water pressure low, hampering the work of the firemen. After a battle which lasted an hour and a half, however, they managed to bring the flames under control. The buildings, one and two stories, frame and stone, which were destroyed were: Tuberculosis building, the sleeping quarters of the tuberculosis patients, the laundry, the kitchen, the bakery, maternity building, engine room and three wooden passageways connecting them. The main building, at the rear of which the fire started, was partly fireswept. The wooden passageways connecting the buildings served as a path for the flames. The 350 patients in that part of the hospital destroyed, many of them unable to walk, and some new-born babies, were carried out on their beds, and deposited on the lawn, or carried to the groves at the rear of the hospital. Every ambulance in the city was called to the scene of the fire, and when it was announced that the fire was under control, they were busy removing the shelterless patients to the various Buffalo hospitals. All during the fire, aeroplanes from Curtiss field hummed overhead, the aviators attracted by the flames and smoke. In addition to the ambulances, dozens of automobiles and motor trucks were pressed into services and were used in removing patients to hospitals. Workers were choked by smoke which filled the damaged buildings long before they took fire. But for the fact that the wind was from the north rather than from the opposite direction the greater portion of the institution would probably have been destroyed. Weak streams trickled from the firemen's nozzles as they sought in vain to stay the progress of the flames. Large buildings were consumed with the firemen helpless because of the low water.

MOTOR VEHICLES

New Triple Does Well in Tests.

Charleston, W. V.—Highly pleased with the performance of the new American-La France Type 75 triple combination, the committee in charge of the tests representing the Business Men's Association and business men, the city council, the fire department, civil service board, composed of James I. Pratt, T. B. Davis, city manager M. J. McChesney and fire chief J. Cal Anderson, have notified mayor George A. MacQueen of the acceptance of the machine following thorough tests. The engine test was run four hours without stopping. No pump or engine trouble was experienced during this test. Water was drafted eleven feet, five inches from the Kanawha River on the city levee. A hill-climbing test on the South Side hill was made and a road test of about forty miles was run. The chemical tank was also tested, and all of the tests complied with the contract and specifications. In almost every instance the machine exceeded the power and efficiency that had been guaranteed for it. In the first test the net pump pressure was 119.6; net nozzle pressure corrected, 79.2; average discharge gallons per minute, 809.4; duration of test, two hours. This test was made for full displacement. In the second test the net pump pressure was 200.4; net nozzle pressure corrected, 60.1; average discharge gallons per minute, 434; duration of test, one hour.

Federal Motor Service Combined.

Washington, D. C.—A motors transport service has been created by the War Department to take the place of the motors division of the quartermaster corps. The service will be headed by a general officer, who will serve as an assistant to the quartermaster-general. The new service will consolidate the procurement and operation of all army motor vehicles except the tanks, caterpillars and artillery tractors. A special board of officers is working out details for operation by the service of all classes of trucks, ambulances and motor cars. The object is to eliminate duplication in the purchase, operation and maintenance

of motor vehicles. Each arm of the service having use for motor transportation will be represented in the new service. The motors division has been headed by Brigadier-General Chauncey M. Baker, who, it is understood, will revert to his regular army rank as a colonel of the quartermaster corps. Christian Girl of Cleveland is expected to remain under the reorganized service as chief civilian adviser on motor truck production. For the first time since the production of motor trucks was begun the output in April exceeded 1,000 cars of the three-ton type. From now on the output is expected to show a cumulative increase, the May production being 1,500.

Cost of Running Police Autos.

San Diego, Cal.—According to Carl H. Martin, machinist for the police department, it costs slightly more than seven cents a mile to maintain an automobile, based on figures on the maintenance expenses for the four machines used in the police work. The machines are one seven-passenger Cadillac, one ambulance patrol and two Dodge cars. For the year of 1917 the four cars traveled a total of 40,030 miles. The cost of gasoline per mile figures to \$.0196; oil cost \$.0018 per mile, and tires cost \$.0354 per mile; while miscellaneous charges amounted to \$.0164 per mile, making a total cost per mile of \$.0732.

Six New Fire Pumps Installed.

Portland, Ore.—Added protection to the Portland ship-building industry, and homes as well, was given when six new fire engine pumping machines were recently put into service at various fire stations by city commissioner Bigelow. This meant the retirement of about thirty-seven horses and the closing of a number of outlying fire stations because the automobile pumpers will cover a greater area of territory than the horse-drawn vehicles. The installation of the machines was held up for more than a month by a civil action brought against the city in an effort to restrain the commissioners from accepting the machines. restrain the city commissioners from accepting the machines.

GOVERNMENT AND FINANCE

Plans for Financial Aid to Utilities.

Washington, D. C.—Announcement has been made of the appointment of a committee of bankers who are to co-operate with the War Finance Corporation in the consideration of the financial requirements of public utility companies. This committee is composed of James N. Wallace, President of the Central Union Trust Company; Charles H. Sabin, President of the Guaranty Trust Company; Thomas W. Lamont of J. P. Morgan & Co., and Frederick Strauss of J. & W. Seligman & Co. This follows a recent conference of bankers, War Finance Corporation directors and utility men. This committee is said to have under consideration the organization of a \$100,000,000 corporation, the function of which would be to purchase the securities of public utilities and in turn discount its paper with the War Finance Corporation. Bankers throughout the country would be asked to subscribe to the capital stock of the company in proportion to their ability to do so, thus spreading any risk which might be involved and at the same time insuring the active co-operation of leading financial interests in all sections toward securing better treatment for public service properties. This plan is not popular among bankers. The Chicago Clearing House has named E. D. Hulbert, of the Merchants Loan & Trust Company; George M. Reynolds, of the Continental & Commercial Bank, and F. O. Wetmore, of the First National Bank, as a committee to consider the need of public utility relief from the various financial burdens of the present.

The War Industries Board has sent to Congress the draft of a proposed bill to appropriate \$200,000,000 to increase the power supply in overloaded industrial centers of the East. Cities along the Atlantic seaboard in which munitions and materials for war are being manufactured would

be the especial beneficiaries under the measure, which has been committed to the care for the present of Representative Kitchin, chairman of the House ways and means committee, and of Senator Martin of Virginia, chairman of the appropriations committee. The measure is said to have the backing of President Wilson. It is felt in Washington that much more than \$200,000,000 will be needed, inasmuch as in the Pittsburgh district alone, which supplies power for a radius of 100 miles, \$40,000,000 or \$50,000,000 for additional plant facilities might be needed. The War Industries Board is now making a census of the various power needs of the different localities engaged upon war work.

New Manager for Grand Rapids.

Grand Rapids, Mich.—Manager Gaylord C. Cummin, who recently resigned "as a result of interference upon the part of his commission in certain of the administrative departments," has been succeeded by Fred H. Locke, formerly the director of the public welfare department. The relations between manager Cummin and the commission had been growing continually more strained for some time. Manager Cummin finally announced that he would resign if the commission changed the method of operation of his departments, on the grounds that he did not care to assume responsibility for the results produced by an organization which was altered without his consent. The commission, disregarding the challenge, made certain changes at the time of passing the budget and the manager's resignation resulted. Mr. Cummin has been recognized as one of the leading men in the city manager profession, and at the Detroit convention last November he was elected president of the City Managers' Association. He has had a rapid rise. His first experience under the commission-manager regime was as city engineer under Manager Henry M. Waite at Dayton, Ohio. He was appointed manager of Jackson, Mich., in 1915, at a salary of \$5,000, this was increased the next year to \$6,000, then to \$7,500 and the Grand Rapids position has paid \$10,000. Mr. Cummin is now assistant to the president of the Kelsey-Brewer Co., public utility operators at Grand Rapids.

City Votes to Retain Commission Form.

Huron, S. D.—At the recent election every ward in the city registered a majority for the commission form of government.

To Cancel "Non-Essential" Contracts.

Philadelphia, Pa.—Councils have passed a measure making it possible for the mayor, with the assistance of the city solicitor, city controller and a department head, to arrive at a basis for the cancellation of all contracts that do not directly aid wartime activities. The final decision as to the terms of cancellation in each particular case will rest with councils and for that reason special sessions may have to be called or financial settlements postponed until fall. Councils, under the contract bill, as finally framed, may be called together at any time to confirm or reject settlements agreed to by contractors and city officials. Most of the contracts to be annulled lie in the department of public works and director Datesman hopes to have much of the work completed before a settlement is arrived at. Because of the many unusual items entering into the annulment of the subway contracts held by the Keystone State Construction Company, an ordinance giving the mayor and director Twining the right to settle with the company was passed. Unlike the general ordinance on the settlement of contracts, this bill permits the officials to settle without referring their settlement to councils for ratification. On but two of the subway contracts—the ones for Arch and Locust streets—is the National Surety Company, the concern for which the Thomas B. Smith company is Philadelphia agent, the surety. The contracts total \$2,900,000, and the annulment of them leaves the mayor's company without further responsibility and with the full premium paid. As yet the mayor has made no announcement of his plan to settle equitably the bonding end of the contracts with the city.

NEWS OF THE SOCIETIES

CALENDAR OF MEETINGS.

June 27-29.—AMERICAN CONCRETE INSTITUTE. Annual meeting, Atlantic City, N. J.

June 26-29.—SOCIETY FOR THE PROMOTION OF ENGINEERING EDUCATION. Annual meeting, Northwestern University, Evanston, Ill.

July 10-12.—OHIO ELECTRIC LIGHT ASSOCIATION. Twenty-fourth annual convention, Breakers Hotel, Cedar Point, O. Secretary, D. L. Gaskill, Greenville, O.

Aug. 27-29.—LEAGUE OF CITIES OF THIRD CLASS IN PENNSYLVANIA. Nineteenth annual meeting, Erie, Pa. Secretary, Fred H. Gates, city clerk, Wilkes-Barre, Pa.

Sept. 24-27.—INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS. Annual convention, Atlanta, Ga. Secretary, Clarence R. George, Houston, Tex.

Oct. 2-4.—AMERICAN SOCIETY OF MUNICIPAL IMPROVEMENTS. Annual meeting, Buffalo, N. Y. Secretary, Charles Carroll Brown, 304 E. Walnut St., Bloomington, Ill.

International Association of Fire Engineers.

The International Association of Fire Engineers held its forty-sixth annual convention beginning June 4, in Chicago, the headquarters being at the Hotel Sherman.

Chief Thomas A. Clancy opened the meeting; city prosecutor Harry B. Miller, representing mayor Thompson of Chicago, delivered the address of welcome and fire marshal Thomas O'Connor of Chicago added his greetings. Chief William H. Bywater of Salt Lake City responded. The names of the committees for the convention were then read.

At the afternoon session, president Clancy read a communication from chief W. L. Sandidge of Lynchburg, Va., urging that the association request the government to exempt from military service all men in fire department service because of the great difficulties facing fire work because of war conditions. Chief John Kenlon of New York, read a paper on "Automatic Sprinkler Alarm Service." At his suggestion, a committee was appointed to investigate and report on a method of standardizing equipment of sprinkler systems and alarms. Chiefs Philip J. Harty of the Youngstown, O., Sheet and Tube Co.; N. V. Holmes, fire marshal of Sears, Roebuck & Co., of Chicago, and chief Thomas J. O'Connor of the General Electric Co., Schenectady, N. Y., discussed "The Relation of City with Industrial Plant Departments and the Best Methods of Co-operation." The subject was referred to a special committee to co-operate with industrial plant chiefs. Chief Kenlon of New York suggested that rules be formulated for the benefit of such chiefs who are seeking information. Chief Espey of Elmira urged that more protection be given to fire-fighting equipment in industrial plants.

A memorial service was held in the

evening in honor of the members who have died since the previous convention. Addresses were made by Rt. Rev. Bishop Samuel Fallows, Michael L. Igoe of the Illinois legislature, and chief C. H. Henderson of Bradford, Pa. The report was read of the committee on memorial resolutions, of which chief F. J. Wagner of Washington, D. C., is chairman.

The Wednesday morning session was presided over by vice-president A. A. Rozetta of Nashville, Tenn. F. M. Griswold, of the National Fire Protection Association, spoke on the work of standardizing couplings and standardizing the tools with which the conversion is done. Chief William H. Murphy of Philadelphia read a paper dealing with "Exposure Hazards." "Four Wheel Motor Apparatus" was the subject of a paper by chief William H. Daggett of Springfield, Mass., read into the proceedings. Much discussion followed the paper on "Drill and Training, What Kind? How Frequently? And What Provision Necessary For?" by chief Frank G. Reynolds of Augusta, Ga.

After a luncheon at the Hotel Sherman, at which E. A. Bancroft, general counsel of the International Harvester Co., made a greatly appreciated patriotic address, the delegates visited the Underwriters Laboratories and then an exhibition of fire apparatus in

action at the Municipal Pier. An alarm was sent in and nearby apparatus responded, including motor pumping engines and ladders. A fireboat was demonstrated and also two pumps installed on the pier.

At the round table discussion in the evening, fire marshal James McFall of the Emergency Fleet Corporation of the U. S. Shipping Board opened on the subject "Fire Equipment and Protection of Our National Shipyards." The whole subject of protection of yards, as well as munition and other war factories, was threshed out and the methods of co-operation between city departments and plants discussed in detail. A resolution that a committee be appointed to report on the possibilities of training women for fire department work such as office duties or with the fire alarm service was defeated. With chief Kenlon in the chair, the subjects of exercise and recreation were discussed. The problem of two platoons was brought up in the consideration of the topics, "How Can Inspections of Buildings Best Be Carried On in Two-Platoon Departments?" and "Can Men in Off-Shift in Two-Platoon Departments Be Depended on for Serious Fires? If So, What Arrangements Are Necessary for Calling Them?"

The Thursday morning session opened with a paper on "Feasibility of Gasoline Driven Fire Boats," by chief Charles Schnibben. The same topic was taken up in a paper by A. B.

(Continued on page 540.)

PROBLEMS CITIES ARE STUDYING WITH EXPERTS

Lawrence County, Deadwood, S. D., is to improve about 16 miles of ROAD. The engineer for the work is J. A. Whittaker.

North Bergen, N. J., is to make STREET IMPROVEMENTS. The engineer, S. Maulbeck, has been retained to draw plans for the work.

A SEWERAGE SYSTEM is to be built by the village of Dearborn, Mich. The consulting engineer for the improvement is Clarence W. Hubbell.

The Essex Border Utilities Commission, Windsor, Ont., is to instal new SEWAGE PUMPING equipment. Morris Knowles, Ltd., is in charge of the whole project.

Berrien County, St. Joseph, Mich., is to build a concrete BRIDGE to cost about \$75,000. Plans and specifications for the structure were prepared by Charles W. Cole.

Riverside County, Riverside, Cal., is considering a big IRRIGATION SYSTEM for part of the Chucawalla desert at a cost of \$4,000,000. The engineering firm of Koebig & Koebig has been retained to make a survey of the area.

New SEWERS and SIDEWALKS are to be built by Rochester, Mich. Plans were prepared by the Southern Michigan Engineering Co.

Coke County, Robert Lee, Tex., is to construct fifty miles of HIGHWAY. The engineers for the improvement are the firm of Hess & Skinner.

The paving of STREETS and the construction of BRIDGES are improvements projected by Mill Valley, Cal. The engineer for the work is C. E. Sloan.

An OUTFALL SEWER is to be built by Merchantville, N. J. The engineering firm of Remington & Vossbury had charge of the plans for the work.

The WATERWORKS of Peekskill, N. Y., will be improved by the installation of new pumping equipment. The consulting engineer for the work is Henry W. Taylor.

Boston, Mass., is to undertake the RESTORATION of the historic Faneuil Hall, including fireproofing and fire protection. The firm of Cram & Ferguson, architects, has been retained to have charge of the work.

NEW APPLIANCES

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations.

KOEHRING MIXER LOADER.

New Device Eliminates Wheelbarrows and Cuts Costs.

The Koehring mixer loader is a combination of measuring bins and the belt conveyor principle applied to a light portable machine, which is supplied with its own power, and traction, moving from job to job under its own power and in paving work preceding the mixer. Its main purpose is to save labor and money and in these days of innumerable difficulties for the contractor, such a machine will prove of inestimable value. The loader is designed to eliminate all wheelbarrows and therefore to increase the production of the mixer; reduce the danger of interruption due to labor shortage, and help finishing up contracts on time.

The loader is adapted for use either with end-loading paving mixers or with side-loaders used in construction work. It can be used with any mixer without changes in the mixer except the placing of a baffle plate in open end loading skips, which is a simple job for any local mechanic. No baffle plate is required with closed end loading skip.

In paving work it precedes the mixer under its own power. In use with side-loading construction mixers it bridges the gap between materials and the mixer—thus the materials may be unloaded at the curb side, shoveled into the measuring bins of the loader and conveyed by the moving belt to the mixer at the base of an elevating tower, at the side, or on the inside of the building.

How much the saving due to elimination of all wheelbarrows amounts to depends, of course, on the individual practice in loading crew organization, as well as on the individual shovelers. No estimate of the money-saving possibility can be absolutely accurate. However, the use of the Koehring loader in operation of a two-bag paving machine on street work shows the possible pay-roll saving. The loading crew usually consists of four wheelers for stone and two for sand—in other words six

wheelers per batch—and two sets of wheelers and one set additional shovelers are usually required to keep the mixer operating at top capacity. This means in all eighteen men. If, with the Koehring mixer loader six men are retained for shoveling materials from sub-grade into measuring bins of the loader, a total of twelve men or all the wheelers have been eliminated. In addition to this pay-roll saving, there is a material cut in yardage costs due to the consistent, high-speed operation of the mixer made possible by continuous loading of the mixer without any delay.

The full over-all length of the machine is approximately sixty feet. It receives materials from any point within this distance of the mixer. For shipping, half of the frame is quickly detachable. The measuring bins are mounted on the frame and provided with wheels which roll on tracks on the top and along the length of the frame. According to the capacity of the mixer, two or three bins are provided. As materials are shoveled from the subgrade, as in paving work, these bins are moved along the top of the frame to maintain them in convenient shoveling position to materials. Each bin is adjustable. The sides are extendable so as to hold the proper proportion of aggregate for any size of batch. By striking off the bins an accurate measurement of materials is obtained. The entire frame is adjustable up and down, providing plenty of clearance for traveling from job to job, and permitting the structure to be lowered to a point of small "lifts" in shoveling materials from the subgrade. The range of this adjustability is ten inches.

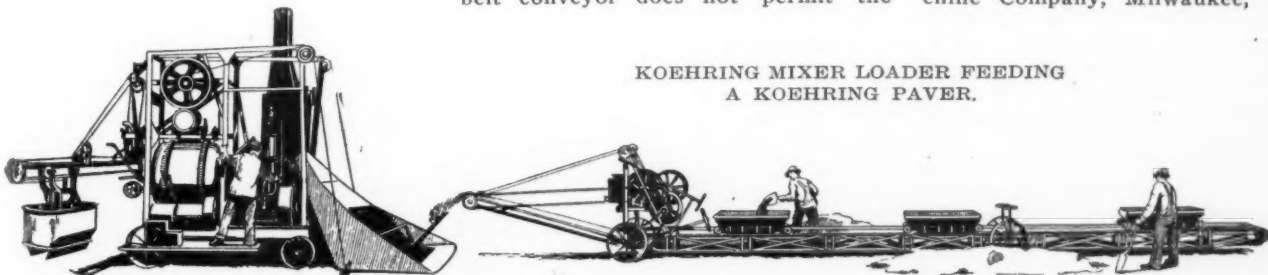
When bins are filled with aggregate, properly measured, a lever control opens the bottom of each bin, permitting aggregate to fall on the conveyor belt, moving at the speed of 500 feet per minute, which carries materials to the mixer and into the loading skip, which is then operated in the usual way. The speed of the conveyor belt, necessitates the use, either of the loading skip or a measuring batch hopper, because the high speed of the belt conveyor does not permit the

new charge to be started toward the drum until the last batch has been completely discharged. This would cause a delay on each batch, and a delay on the part of the bin loaders. The mixer loading skip or batch hopper, however, is always ready to receive the aggregate from the belt conveyor, and the shovelers can instantly reload the measuring bins of the loader. In the meanwhile when the last batch has been two-thirds discharged from the drum, the loading skip has been started as is the usual practice so that the new aggregate enters the drum at the instant the last preceding batch is discharged.

The regular loading skip or measuring batch hopper thus serves the function of a storage supply of aggregate instantly available, permitting the measuring bins of the mixer loader to be refilled without reference to the discharge of the preceding batch from the drum. The conveyor belt is easily adjusted, both in regard to slack and to maintain its flat horizontal position so that materials will not spill even when the frame is resting on the incline of a sub-grade.

The frame is made of trussed angle iron and the trucks are all steel, with automatic type knuckle steering axle. The frame can be lowered or raised 10 inches. The machine can turn in a radius of 63 feet, or 55 when the end is detached. The belt is of four-ply rubber, 22 inches wide, running 500 feet per minute. The measuring bins have a top opening 36 in. wide and 48 in. long, the height from the ground being 29½ to 34½ in. The bins can be adjusted at half cubic foot intervals from 3½ to 6½, inclusive, and also for a capacity of 7¼ cubic feet. The capacity of the machine is 100 cubic feet per minute. Power is from a 5 h. p. horizontal four-cycle hopper cooled gasoline engine. Traction speed is 70 feet per minute forward and 75 reverse. All bearings are of the universal type, supplied with compression grease cups.

The loader which is shown in the accompanying illustration, is made by the makers of the well-known line of concrete equipment, the Koehring Machine Company, Milwaukee, Wis.



KOEHRING MIXER LOADER FEEDING
A KOEHRING PAVER.

INDUSTRIAL NEWS

Cast Iron Pipe.—Manufacturers of cast iron pipe are engaged for more than 50 per cent of capacity on Government work, so that private buying is not very definite as to delivery and dependent on the supply of pig iron available after direct and indirect war needs are satisfied. At the present time pipe for non-war enterprises can be delivered in six to eight weeks. The orders for Government use come from a variety of sources and altogether involve a considerable tonnage. Government prices include new freight rates. Quotations: Chicago: 4-inch, \$65.05; 6-inch and larger, \$62.05; Class A \$1 extra. Birmingham: 4-inch, \$58; 6-inch and larger, \$55; Class A \$1 extra. New York: 4-inch, \$64.75; 6-inch and larger, \$64.75; Class A \$1 extra.

Cement Placed on Priorities List.

The recent action of the War Industries Board in placing cement on the priorities list until August 1 is expected to have vital effect on building material and construction interests. This is the first really official indication that the federal authorities have recognized basic building materials as equally important as steel, iron and similar products. The Portland cement industry has been on the essential list since April 30, but owing to shortage of labor, production in Zone I, at least, has not exceeded 55 per cent of normal. Meanwhile, consumption of this commodity, mainly for war purposes, has been so great that the supply is endangered. The War Industries Board, before which the conference was held, was reluctant to take the period longer than August 1 because it was not certain just what the fuel situation will be then, but later on there is to be another conference to determine whether the priorities shall be continued further than August 1.

The American Appraisal Company, Milwaukee, Wis., with offices in the principal cities, has recently made two appraisals of interest. In connection with a difficult controversy between the city of Norfolk, Va., and the Norfolk County Water Co., in which the United States Government is now interested, the American Appraisal Company made an appraisal of the plant. It also recently appraised the plant of the Montreal Water and Power Co., and is now revising this work for possible court proceedings. The American Appraisal Company's booklet, "Modern Appraisal Service," gives an interesting account of the growth of the organization and the wide acceptance of its principles of impartial valuation. The "continuous service" developed by the company is described—a system by which the appraisal is made the beginning of co-operation between the company and the plant management in maintenance of sci-

entific control over all accounting and financing in harmony with the appraisal. The use of appraisal for accounting and cost-finding, taxation, fire insurance, banking, credit, etc., is explained. The company makes appraisals of public utility and municipal property, industrial plants, residences, lands, commercial and other property.

NEWS OF THE SOCIETIES

(Continued on page 538)

Stevens, a marine engineer of Jacksonville, Fla., and the general opinion seemed to favor the prospects for success for gasoline boats. The fighting of fire on board vessels was considered in a paper by deputy chief Worth of New York. Fire prevention in munition plants and conservation were taken up by former fire commissioner Herman L. Ekern of Wisconsin.

In the afternoon district chief Shallow of Boston read a paper on fire-fighting in vessels and chief C. W. Ringer read one on "The Proper Safeguarding and Prevention of Fires in Mills and Elevators" (see this issue).

The determination of the next meeting place and date was left to the board of directors. A resolution by chief Kenlon that the federal authorities be requested to grant priority for fire department equipment was approved. The secretary reported that 260 active members, two honorary and 86 associate members were in attendance at the convention. The report of a special committee on sprinkler systems, of which chief Howard L. Stanton is chairman, was ordered printed. The delegates approved an amendment to the constitution, proposed at the previous convention, by which associate members may be elected to life membership without payment of a fee.

The following officers were elected: Chief A. A. Rozetta, of Nashville, Tenn., president; chief John Kenlon, of New York City, first vice-president; chief John F. Healy, of Denver, Col., second vice-president; marshal James McFall, of Washington, D. C., secretary, and chief Peter J. Carter, of Camden, N. J., treasurer. The following were named as state vice-presidents by the committee on the subject:

Alabama, J. W. Blakely; Arizona, B. W. Norton; Arkansas, Lloyd Tate; California, M. D. Murphy; Colorado, P. D. McCartin; Connecticut, Henry H. Heitman; Dist. of Columbia, F. J. Wagner; Delaware, Patrick J. Golden; Florida, Chief Coleman; Georgia, A. J. Land; Illinois, C. W. Devore; Indiana, Edward Shanman; Iowa, Peter Denger; Kansas, John McNewey; Kentucky, Edward Griffith; Louisiana, Frank Roddy; Maine, George Stackpole; Maryland, August Emrich; Massachusetts, W. H. Daggett; Michigan, C. H. Russell; Minnesota, Frank Whitmore; Mississippi, E. P. Donovan; Missouri, P. P. Kane; Manitoba, J. E. Buchanan; Nebraska, Robert Lewis; New Hampshire, Arthur Spring; North Carolina, Charles Schnibben; North Dakota, J. H. Kelly; New Mexico, Jacob Klein; New York, Howard Rodgers; New Jersey, Harry Francis; Ohio, C. R. Bowersox; Oregon, Charles Foster; Oklahoma, Charles Chapman; Ontario, J. Smith; Pennsylvania, Fred Vanderholdt; Rhode Island, Reuben Weeks; South Carolina, H. B. Wells; South Dakota, Wm. A. Sloan; Saskatchewan, W. A.

White; Tennessee, B. L. Warlick; Texas, B. S. Fritz; Utah, G. A. Graves; Vermont, F. J. Guerin; Virginia, W. H. Joynes; Washington, F. L. Stetson; W. Virginia, E. T. Rose; Wisconsin, W. R. Trotter; Wyoming, T. J. Cahill.

National Board of Fire Underwriters.

Losses by fire in the United States in 1917 aggregate \$250,753,640 against \$214,530,995 in 1916, the losses last year having exceeded any year since 1875, with the exception of the San Francisco fire in 1906. These figures were made public at the fifty-second annual meeting of the National Board of Fire Underwriters at the Hotel Astor. R. M. Bissell, president of the Hartford Fire Insurance Company, and president of the National Board, presided at the meeting, which was attended by 137 prominent fire underwriters from all sections of the country.

Otho E. Lane, chairman of the board's committee on statistics and origin of fires, declared that the per capita loss rose from \$2.10 in 1916 to \$2.42 in 1917. Owing to unsettled conditions no attempt was made in 1917 to secure statistics showing fire losses in European cities.

Contrary to the general impression enemy aliens had little or no part in the losses by fire since the United States entered the war. On this point president Bissell, in his annual report, said: "As soon as the war began it was realized that the danger of fires caused by enemy incendiaries was not to be ignored, and, as was perhaps natural, many sensational rumors gained currency, among them one which mistakenly quoted the National Board of Fire Underwriters as authority for the statement that property to the value of \$43,000,000 had been destroyed by fires caused by enemy aliens during the first nine months of the war. This published statement had the careful attention of our actuarial bureau, and disclosed the fact that as to nearly 95 per cent. of the fires cited there was no proof of incendiary origin, and as to nearly 90 per cent. no reason even for suspicion of such origin. This does not indicate the absence of danger from hostile alien incendiaries, but shows that their success thus far has been by no means as great as was to be expected."

The board's executive expressed the belief that the increase in fire losses was due to war conditions, which had called for the speeding up of industries, the hasty construction of new factories, congestion and overtime.

The election of officers resulted as follows: President, Frederick C. Buswell, Home Insurance Company; vice-president, Charles L. Case, London Assurance Company; treasurer, Charles J. Holman, Commercial Union Company, and secretary, George G. Bulkley, Springfield Fire & Marine Company; executive committee: C. G. Smith, Henry E. Rees, P. L. Hoadley, Frank Lock, Lyman Candee, R. D. Harvey, J. B. Levison, W. R. Hodge, A. D. Baker and Edward Meinel.

ADVANCE CONTRACT NEWS

ADVANCE INFORMATION BIDS ASKED FOR

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

CONTRACTS AWARDED ITEMIZED PRICES

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS.				
Mich., Tawas City.....	June 29..	Constructing roads	F. E. Dease, Clk. Board of Comrs.	
Mich., Edmore	June 30..	Constructing 5% mi. of road.....	City Clk.	
Cal., Glendale	June 30..	Grading and paving with 5-in. concrete pavement, 1-in. asphaltic cement binder course and 2-in. asphalt wearing surface; cement curbs, reinforced concrete culverts, service pipes, etc.....	J. C. Sherer, City Clk.	
W. Va., Hamlin.....	July 1..	Paving and grading 10 miles of highway with reinforced concrete, brick, bituminous macadam or waterbound macadam	Co. Engr.	
Cal., Martinez	July 1..	Constructing highway system.....	J. H. Wells, Co. Clk.	
Ill., Sterling	July 1..	Paving 6 blocks with concrete.....	E. O. Hills, Engr., Fulton, Ill.	
N. J., Ocean City.....	4 p.m., July 1..	Filling, grading, graveling, paving with cement and bulk-heading along ocean front.....	Harry A. Morris, City Clk.	
Cal., Los Angeles.....	2 p.m., July 1..	Constructing concrete road at county hospital.....	H. J. Leland, Co. Clk.	
Ind., Knox	7:30 p.m., July 1..	Street improvement	Russell Thompson, Co. Clk.	
Ind., English.....	2 p.m., July 1..	Constructing stone or other type road.....	O. D. Tatlock, Co. Aud.	
Cal., San Jose.....	11 a.m., July 1..	Repair and construction of three miles of road.....	City Clerk.	
Ind., Spencer	2 p.m., July 1..	One motor truck for hauling gravel and stone; also elevating grader and wagon loader.....	S. L. Royer, County Auditor.	
Ind., Greenfield	July 1..	3 miles grading, draining and paving with gravel.....	Chas. Boone, County Engr.	
Fla., Quincy	10 a.m., July 1..	Improving 9.3 miles road.....	F. F. Morgan, Clerk Circuit Courts.	
Ill., Chicago	July 1..	Paving 1½ mile 18 ft. wide on 30 ft. roadway, 6 to 8-inch concrete on earth foundation.....	B. D. Barber, Engr., Cook Co. Bldg.	
Mont., Helena	10 a.m., July 1..	One combination road machine consisting of one power-drawn road grader and scarifier, one gasoline motor engine, caterpillar type, and one horse-drawn 6-ton street roller	V. N. Kessler, City Clerk.	
O., Columbus	noon, July 2..	Constructing sidewalks on 12 streets.....	Geo. A. Borden, Dir. of Public Service.	
Ind., Rochester	2 p.m., July 2..	Grading, draining and paving with brick.....	Ernest A. Smith, Co. Auditor.	
Pa., Harrisburg.....	10 a.m., July 2..	Reconstructing roads involving 88,345 ft. reinforced concrete and 11,336 ft. vitrified block in seven counties.....	J. Denny O'Neill, State Hwy. Comr.	
Ind., Bloomington.....	2 p.m., July 2..	Constructing two roads.....	Horace Blakely, Co. Aud.	
N. Y., New York.....	noon, July 2..	Regulating and repaving with granite block on concrete foundation	C. D. VanName, Boro. Pres., Richmond, New Brighton, S. I.	
N. Y., New York.....	10:30 a.m., July 2..	Repaving with sheet asphalt on concrete foundation; regulating, grading, setting curb, laying sidewalks, etc., and paving with bituminous concrete on cement concrete foundation	Henry Bruckner, Boro. Pres.,	
R. I., Providence.....	noon, July 2..	Reconstructing roads. 7,230 ft., including earth excavation, stone foundation, crushed stone base and 14,500 sq. yds. bituminous concrete surface.....	State Board of Public Roads.	
Tex., Cleburne	July 3..	Constructing road to cost about \$100,000.....	Co. Comrs.	
N. Y., New York.....	11 a.m., July 3..	Regulating and repaving with asphalt on concrete foundation on two streets.....	Ed. Riegelmann, Boro. Pres., Brooklyn.	
R. I., Providence.....	noon, July 3..	7,230 ft. of state highway, including 14,500 sq. yds. bituminous concrete surface.....	State Bd. of Pub. Wks.	
Ind., Columbia City.....	noon, July 3..	Constructing gravel road.....	T. A. McLaughlin, Co. Aud.	
Ind., Auburn	10 a.m., July 3..	Constructing 15,200 ft. concrete roads.....	S. P. Nelson, Co. Aud.	
Pa., Plains (Parsons P. O.).....	7:30 p.m., July 5..	Grading, paving and curbing a number of streets.....	Fred Butts, Twp. Engr., Miners Bank Bldg., Wilkes-Barre, Pa.	
Ind., La Porte.....	10 a.m., July 5..	Road construction	Fred A. Hausheer, Co. Aud.	
Tex., Liberty	July 8..	Constructing a number of roads to cost about \$115,000.....	N. Smith, Co. Judge.	
Minn., Chaska	2 p.m., July 8..	Road surfacing 26.5 miles, including graveling.....	State Hwy. Comn., St. Paul, Minn.	
N. D., Bowman	2 p.m., July 8..	17.7 miles road construction, including 20,520 cu. yds. turnpiking, 34,282 cu. yds. excavation, etc.....	State Hwy. Com., Bismarck, N. D.	
Pa., Sharon.....	July 9..	7,225 sq. yds. pavement on a 6-in. concrete foundation.....	City Clerk	
Tex., Cooper	1 p.m., July 10..	Paving about 15,000 sq. yds.; 3,600 ft. curb and gutter....	Henry E. Elrod, Engr., 505 Interurban Bldg., Dallas, Tex.	
N. J., Trenton.....	10:30 a.m., July 10..	37,000 sq. yds. portland cement concrete road surfacing.....	State Highway Commission.	
N. D., Jamestown.....	2 p.m., July 10..	9.16 miles road construction, including 16,550 cu. yds. turnpiking, 27,965 cu. yds. excavation, etc.....	State Hwy. Com., Bismarck, N. D.	
N. D., Fessenden.....	2 p.m., July 11..	18 miles road construction, including 29,862 cu. yds. turnpiking, 27,799 cu. yds. excavation, etc.....	State Hwy. Com., Bismarck, N. D.	
Pa., Harrisburg	10 a.m., July 11..	Improving with one-course plain concrete, vitrified block on concrete base, bituminous concrete, Hillside vitrified block on concrete foundation.....	J. D. O'Neill, State Highway Comr.	
Pa., Harrisburg.....	10 a.m., July 11..	Reconstructing nine state highways in eight counties, involving 32,199 ft. plain concrete, 4,983 ft. vitrified block or plain concrete; 2,334 ft. plain concrete or bituminous concrete and Hillside vitrified block, 1,842 ft. vitrified block, 15,918 ft. plain concrete or bituminous concrete or concrete foundation, 18,083 ft. plain concrete and Hillside vitrified block, 3,319 ft. grading and draining	J. Denny O'Neill, St. Hwy. Commr.	

BIDS ASKED FOR

STATE	CITY	RECD UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
N. J.	Beverly	July 12	Concrete curbs and gutters in Edgewater Park	J. J. Logan, Engr., Mt. Holly, N. J.
N. D.	Rugby	noon, July 12	5 miles road construction, 3½ miles with sand-clay surface, including 8,436 cu. yds. turnpiking, 11,293 cu. yds. earth excavation, etc.	State Hwy. Com., Bismarck, N. D.
O.	Avon Lake	noon, July 13	Macadamizing road	W. R. Hinz, Vil. Clk.
Ill.	Joliet	July 15	Brick pavement	Phil. Pick, City Clk.
O.	Hamilton	10 a.m., July 29	Constructing ditches, reshaping, filling roadway and graveling	County Surveyor.
SEWERAGE.				
Mich.	Niles	8 p.m., June 29	Sewer construction	City Clk.
Ind.	Connersville	June 30	Constructing sewers on a number of streets	R. E. McClure, City Clk.
Ind.	Greenfield	10 a.m., July 1	Constructing sewers	Chas. Boone, County Engr.
Wash.	Grandview	July 1	Constructing sewer	C. H. Green, Engr., Spokane, Wash.
N. J.	Linden	8 p.m., July 1	170 ft. 8-in. stoneware pipe sewer with manholes, Y branches and appurtenances	J. L. Bauer, Twp. Engr., Elizabeth, N. J.
N. Y.	New York	11 a.m., July 2	Constructing sewers and appurtenances on several streets	M. E. Connolly, Boro. Pres., L. I. City.
Ia.	Sibley	10:30 a.m., July 3	Constructing drainage ditches involving 6 to 38-inch cement and vitrified tile	D. W. Clayton, Co. Aud.
Kan.	Newton	July 3	Constructing sewage disposal plant, including pump house, pumps, Imhoff tank, sprinkling filter, secondary settling tank, and sludge filter, connecting sewers, manholes, etc.; vitrified pipe sewers	Black & Veatch, Engrs., Interstate Bldg., Kansas City, Mo.
Ia.	Sibley	10:30 a.m., July 4	Constructing drainage ditches involving 6 to 36-inch cement and clay tile; two reinforced concrete bulkheads	D. W. Clayton, Co. Aud.
Mont.	Bozeman	5 p.m., July 5	Constructing sanitary sewer, including 2,100 ft. 8-inch pipe, 160 Y branches, manholes, 2,420 ft. trenching, etc.	C. A. Spieth, City Clerk.
Ont.	Windsor	noon, July 8	Furnishing and testing three motor-driven pumping units, one with 500 Imperial gallons capacity per minute and two with 1,000 gallons	Morris Knowles, 8 Royal Bank Building.
Ia.	Montezuma	2:30 p.m., July 8	Constructing outlet sewer, 1,425 ft. 15-in. vitrified sewer pipe, part of pipe from taking up existing line; sewage treatment plant consisting of cylindrical Imhoff tank, 20-ft. diameter and 20 ft. deep, hollow tile superstructure, concrete dosing chamber, 26x32½ ft., four alternating siphons; three sand filter beds, 60x150 ft., sludge bed, 30x40 ft.	John H. Dunlap, Cons. Engr., Iowa City, Ia.
Utah	Salt Lake City	10 a.m., July 9	Constructing sewer extension	Gordon Snow, City Rec.
Conn.	Bridgeport	July 10	Constructing sewage treatment plant	W. Chew, Chairman, Paving & Sewer Commission.
D. C.	Washington	10 a.m., July 31	Five concrete bridges for city in West Indies (refer to file No. 100222)	Bureau of Foreign and Domestic Commerce, Dept. of Commerce, Wash., D. C.
WATER SUPPLY.				
Mich.	Ironwood	5 p.m., June 29	1,000,000 gal. reinforced concrete reservoir	City Clerk.
N. J.	Perth Amboy	July 1	Building 40,000,000 gal. concrete reservoir	G. A. Johnson, 150 Nassau St., New York City.
S. D.	Wessington	July 1	Constructing 800 ft. water mains; also hydrants	R. M. King, City Auditor.
N. J.	Fort Lee	July 3	Constructing 10-in. cast iron pipe to pumping plant	Twp. Comrs.
Ont.	Kitchener	July 8	Taking down steel standpipe and sale of material in standpipe	H. Hymmen, Supt. Water Works.
Conn.	Hartford	noon, July 10	Constructing 4,800 ft. 48-in. reinforced concrete pressure conduit, built either in place or precast	C. M. Saville, 1026 Main St.
LIGHTING AND POWER.				
N. S.	Halifax	June 29	Constructing service building, power house, tunnels, etc., in connection with sanatorium at Kentville	E. H. Armstrong, Com. of Pub. Works.
FIRE EQUIPMENT.				
Mich.	Detroit	2 p.m., July 8	Furnishing five 6-cylinder, 750-gallon combination pumping engine and hose cars equipped with satisfactory hydrant thawing device; one 6-cylinder, four-wheel tractor-drawn, 85-ft. aerial ladder truck fully equipped with ladders; two 6-cylinder city service trucks equipped with ladders, net and chemical tank	Geo. J. Finn, Sec. Fire Com.
BRIDGES.				
W. Va.	Charleston	noon, June 29	Masonry substructure for highway bridge	State Road Dept., Morgantown, W. Va.
O.	Newark	June 29	Constructing several bridges, abutments and flooring	F. S. Wilson, Co. Aud.
Ont.	Tecumseh Township	June 29	Constructing bridge	Frank Barber, Con. Engineer, Toronto.
Wash.	Ephrata	July 1	Constructing two stone abutment bridges	Co. Engr.
Ind.	Rushville	2 p.m., July 1	Constructing two bridges	W. H. McMillin, Co. Aud.
Ind.	Sullivan	noon, July 1	Constructing six concrete bridges	F. M. Daniels, Co. Aud.
Ind.	Greenfield	10 a.m., July 1	Constructing bridges	Chas. Boone, County Engr.
Cal.	Yreka	July 1	Constructing two reinforced concrete bridges	County Clerk.
Minn.	Erdahl	2 p.m., July 1	Constructing 15-ft. bridge with creosoted timber piles, steel beam span and concrete floor	State Hwy. Comm., St. Paul.
Ind.	South Bend	11 a.m., July 1	Constructing bridge	Arthur L. Wolf, Co. Auditor.
Minn.	Montevideo	noon, July 1	12-ft. span bridge, reinforced concrete abutments	State Highway Com., St. Paul.
Cal.	Santa Barbara	July 1	Constructing two reinforced concrete bridges	State Hwy. Com., Sacramento.
S. D.	Ardmore	2 p.m., July 2	Steel and concrete bridges during next three months	W. J. Smith, Co. Aud.
S. D.	Montrose	2 p.m., July 2	Reinforced concrete bridges	C. F. Ericsson, Co. Aud.
S. D.	Vermillion	2 p.m., July 2	Bridge construction	W. L. Russel, Co. Aud.
Neb.	Fremont	2 p.m., July 2	Bridges for Dodge county	A. W. Murphy, Chrmn. Bd. of Supervisors.
S. D.	Timber Lake	July 2	Seven wooden bridges	J. I. Wilson, Co. Aud.
Ind.	Winamac	10 a.m., July 2	Constructing two bridges	W. E. Munchenburg, Co. Aud.
S. D.	Huron	2 p.m., July 2	Constructing 12 steel bridges	M. D. Whisman, Co. Aud.
Cal.	Yuba City	10 a.m., July 2	Constructing bridge approach	Bd. of Co. Supvrs.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Ind.	Brownston.....	1 p.m., July	2..Repairing bridges	Albert Luedtke, Co. Aud.
Neb.	Hebron.....	July	2..Constructing 120-ft. span steel bridge.....	B. A. Young, Co. Clk.
S. D.	Watertown.....	2 p.m., July	2..Constructing bridges	J. S. Johnson, Co. Aud.
N. D.	Bowman	2 p.m., July	8..Reinforced concrete box culverts.....	State Hwy. Com., Bismarck, N. D.
Ind.	Connersville.....	2 p.m., July	8..Reinforced concrete bridge; concrete culvert; repairing bridge	Glen Zell, Co. Aud.
Ala.	Opelika	July	8..Constructing 60-ft. concrete bridge.....	W. S. Keller, St. Hwy. Engr., Montgomery, Ala.
N. D.	Dickinson	2 p.m., July	8..32-ft. span bridge.....	State Hwy. Com., Bismarck, N. D.
N. D.	Belfield	2 p.m., July	8..Bridge with 32-ft. span and concrete abutments.....	J. W. Bliss, Chief State Engr., Bismarck, N. D.
Neb.	Ainsworth	noon, July	9..Constructing two bridges.....	R. M. Herre, Co. Clk.
N. D.	Jamestown.....	2 p.m., July	10..Reinforced concrete arch culverts.....	State Hwy. Com., Bismarck, N. D.
N. D.	Fessenden.....	2 p.m., July	11..Relaying old pipe culverts and constructing reinforced concrete arch culverts	State Hwy. Com., Bismarck, N. D.
N. D.	Rugby.....	2 p.m., July	12..Constructing culverts, including reinforced concrete head-walls for 60-inch circular corrugated metal culverts....	State Hwy. Com., Bismarck, N. D.
O.	Georgetown.....	noon, July	17..Constructing bridges, culverts and abutments.....	C. Thomas, Co. Engr.
MISCELLANEOUS.				
N. Y.	New York.....	June 29..	Dredging in San Juan harbor, Porto Rico, and filling adjacent swamp lands.....	U. S. Engr. Office, Room 1131, 44 Whitehall St., N. Y. City.
Ill.	Rock Island.....	2 p.m., June 29..	Disposal of garbage, rubbish, etc.....	M. T. Rudgren, Comr. of Accts. and Finances.
Fla.	Bradentown	10 a.m., July	1..Drain construction	W. M. Taylor, Clk. Co. Comrs.
Cal.	Los Angeles.....	2 p.m., July	1..Constructing retaining wall.....	H. J. Lelande, Co. Clk.
Pa.	Harrisburg.....	10 a.m., July	2..101,937 ft. reinforced concrete pavement in several counties and 11,336 ft. vitrified brick.....	J. Denny O'Neill, State Hwy. Com.
Miss.	Greenville	July	2..Excavating about 2,100,000 cu. yds. drainage channels....	Morgan Engrg. Co., Goodwyn Institute, Memphis, Tenn.
D. C.	Washington.....	July	2..Twelve 15-cu. ft. buckets.....	Genl. Engr. Depot, U. S. Army, 1438 U St.
Ia.	Corning	2 p.m., July	3..Straightening river and constructing ditches.....	F. W. Yeadon, Co. Aud.
Wash.	Seattle	July	5..Following material for municipal street railway: Galvanized guy wire, copper trolley wire, rail bonds, welding flux wire, trolley suspensions, ears and frogs.....	Wm. D. Freeman, City Pur. Agent.
O.	Dayton	July	6..Furnishing 400,000 concrete blocks, 2x1x5 ft. for flexible slab revetment in flood protection work.....	E. Kuhns, Sect. Miami Conservancy Dist.
N. S.	Inverness	July	9..Constructing harbor improvements.....	District Engr., North Sydney, N. S.
Mo.	Memphis	3 p.m., July	10..12 miles of drainage ditch, involving 556,700 cu. yds.....	C. J. Wiegner, Engr.
Md.	Baltimore	July	15..Furnishing and placing riprap stone at light stations....	Lighthouse Inspector.

ROADS AND STREETS

Los Angeles, Cal.—Ordinance of intention adopted for the improvement of Normandie Ave. between Vernon and 54th St.

Los Angeles, Cal.—Board of supervisors receiving bids road district improvement No. 140 (Burr Ave.).

Los Angeles, Cal.—The city engineer instructed to make diagram for the opening and widening of 74th St. between Main and Moneta.

Los Angeles, Cal.—The city engineer instructed to draw plans for the paving of Seaside Ave. from Altoona Pl. to Samples Pl.; Samples Pl. from Seaside Ave. to Ocean Ave., and Ocean Ave. from Samples Pl. to Division Pl.

Los Angeles, Cal.—Resolution adopted authorizing the board of park commissioners to advertise for bids, award and enter into contract for excavation at junction of Los Feliz Ave. and Western Ave.

Los Angeles, Cal.—Ordinance adopted for the improvement of Rose Hill and Prites Ave. improvement district.

Marysville, Cal.—City council ordered plans and specifications drawn for paving B and 12th St.

Marysville, Cal.—City council has decided to macadamize D St., 5th to 8th; 5th St., D to B, and 6th St., C to A.

Sacramento, Cal.—The final ordinance for the construction of the proposed cutoff road from Rose Hill to Huntington drive, to eliminate the dangerous grade crossing at Mission road, Rose Hill, was adopted by the city council. The city and the Pacific Electric will share the cost of the improvement, which will be \$54,000.

Washington, D. C.—A bill appropriating \$20,000,000 for a survey of a national highway connecting national parks in Utah, Arizona and New Mexico was re-

ported favorably by the senate public lands committee.

Washington, D. C.—California appropriations in the sundry civil bill reported to the House are: Yosemite National Park—\$255,000. Of this sum \$15,000 is for a bridge at the old Sentinel bridge site; \$75,000 for grading the El Portal-Yosemite road to a width of 20 feet, and the balance for repair of roads and trails. Sequoia National Park—\$30,510; \$12,000 of which is for a bridge at the old Marble Fork bridge site, the balance for roads and trails. General Grant National Park—\$4,500 for roads and trails. Sacramento river improvement—\$33,000.

Atlanta, Ga.—Secretary of State Henry B. Strang filed with the governor and the state treasurer the apportionment sheet by which disposition of \$225,226.55 is to be made to the counties of the state from the sale of 1918 automobile tags, on the basis of the improved road mileage. The report shows a total of 80,110 miles of improved roads in Georgia officially recorded. The largest sum goes to Hall county, \$4,217.19; De Kalb, second, \$3,978; Monroe, third, with \$3,514, and Carroll fourth, \$3,508. The city counties are apportioned the following amounts: Fulton, \$1,332.63; Bibb, \$984.61; Richmond, \$1,608.15; Chatham, \$635.38; Muscogee, \$643.82; Floyd, \$3,373.75; Chattahoochee, \$705.65; Marion, \$1,180.81; Harris, \$1,937.09; Talbot, \$1,158.32; Taylor, \$1,085.22; Meriwether, \$2,679.32; Heard, \$1,720.61; Troup, \$1,968.02.

Brookfield, Ill.—City may pave this year from South road, Hollywood, through Brookfield, on Brookfield and Ogden Ave., 21,000 sq. yds. reconcrete. Engr. Guy W. Curry, City Hall.

Chicago, Ill.—Cook county commissioners have asked the capital issues committee for permission to sell \$675,000 of the \$1,000,000 road bonds recently authorized.

Delphi, Ind.—Bids received July 2, 1918, at 4 p. m., by treasurer of Carroll county, for sale \$8,640 highway improvement bonds. D. L. Musselman, treasurer.

Indianapolis, Ind.—Board of public works adopted resolution, grading and paving sidewalk and curb, New York St., from White River to Harding.

Mt. Vernon, Ind.—Bids received July 8, 1918, at 2 p. m., by treasurer of Posey county, for sale \$8,200 and \$7,600 highway improvement bonds. Geo. J. Ehrhardt, treasurer.

Peru, Ind.—Bids received July 3, 1918, at 2 p. m., by treasurer of Miami county, for sale \$10,120 highway improvement bonds. Henry Knauff, treasurer.

Portland, Ind.—Bids received July 1, 1918, at 10 a. m., by treasurer of Jay county, for sale \$8,400 highway improvement bonds. John W. Current, treasurer.

Rushville, Ind.—The Arlington bank, Arlington, Ind., was the successful bidder for a \$11,500 issue of Rush county bonds at a bid of par and accrued interest.

Shoals, Ind.—Bids received July 1, 1918, at 12 m., by treasurer of Martin county, for sale \$3,700 highway improvement bonds, 4½ per cent., ten years. Wm. F. Baker, treasurer.

LeMars, Ia.—Board of supervisors passed resolutions to construct a permanent highway from the Woodbury county line to the Cherokee county line. Plymouth county's apportionment for roads under the federal aid act is \$67,244.10.

Detroit, Mich.—Alderman Oscar Riopelle has asked the council to appropriate \$45,900 for the widening and paving of Ferndale Ave., from Springwells to Woodmere.

Lansing, Mich.—City council adopted resolution which provides for a new artificial stone sidewalk, six feet wide, built in front of lots 1, 2 and 3, block 2, Manufacturer's addition on the west side of Pennsylvania Ave.; sidewalk, five feet wide, in front of lot 49, Clear's addition on the south side of Kalamazoo St.; also in front of east 6 feet of lot 48, Clear's addition, on the south side of Kalamazoo St., and in front of lot 86, Harrah's addition on the north side of Kalamazoo St., also in front of lot 273

Highland Park addition, on the south side of Oak St. J. A. Parsons, city clerk.

Lausling, Mich.—City council allowed in this year's budget a highway fund of \$6,000 for each ward except the eighth, which was allowed \$3,000.

Rochester, Minn.—See "Sewerage."

Warren, Minn.—All bids for grading rejected. Will probably ask for new bids. A. C. Lundgren, county auditor.

Highwood, Mont.—County surveyors conferred with a local committee regarding the improvement of the Sag road between here and Shonkin.

Missoula, Mont.—Preliminary steps to creating an improvement district on Jackson St. were recently authorized by the city council.

May's Landing, N. J.—Action was taken by the board of chosen freeholders looking towards the paving of those sections of the new state highway system that are urgently needed in connection with the operation of the two big government shell loading plants located in this county. Preliminary surveys were authorized. An expenditure of approximately three-quarters of a million dollars will be necessary.

Sussex, N. J.—Board of freeholders announced that plans for a waterbound macadam pavement with coating of tar via B for the Ross's Corner-Sussex road were in the hands of the state road officials.

Brooklyn, N. Y.—Bids soon asked 1,500 sq. yds. concrete pavement, 35th St. pier, Brooklyn. Asst. Civil Engr. J. T. Mathews, care U. S. Govt. Navy Dept.

Fushing, N. Y.—See "Sewerage."

Brooklyn, N. Y.—Board of estimates referred the following Queens matters to the committee on city plan and public improvements: Map showing a change in the street grades in the territory bounded by Cobb place, South Railroad Ave., Louona Ave., North Railroad Ave., Tiemann Ave., Kingsland Ave., Peartree Ave., Provost St., Riverside Ave., Radcliff St., Gilroy Ave., Strong St., Morris Ave., Tory St., Riverside Ave., Varick St., Woodhull Ave. and Corona Ave., Corona; map showing a change in the street system by adjusting the angles and dimensions of the Brooklyn line from North Conduit Ave. to Dumont Ave., Woodhaven; map showing a change in the street system within the territory bounded by Junction Ave., Hunt St., Way Ave., Hunt place, Alburts Ave., Havemeyer St., Peartree Ave. and North Railroad Ave., Corona, calling for a reduction in the width of Kingsland Ave. between Junction Ave. and Peartree Ave. from 80 to 60 ft., its present width; map showing a change in the street system for the territory bounded by Elderts lane, 90th Ave., 75th St. and 91st St., Woodhaven; map change calling for the elimination of Hood St. from Hazen St. to Ditmars Ave. and the public park bounded by Hazen St., Hood St. and Ditmars Ave., East Elmhurst.

Newtown, N. Y.—Commissioner of Public Works Sullivan, of Queens, announced that the board had adopted the policy of not sending to the board of estimate any requests for improvements that must be paid for by assessment unless 51 per cent. of the property owners affected sign the petition or express their approval of the improvement. On that theory the board laid over until the October meeting a petition asking for the grading and laying of sidewalks in Gerry Ave., from Junction Ave. to Corona Ave., Elmhurst, and for paving the street with macadam between Toledo and Chicago Sts. The first contract is estimated to cost \$117,200, or \$3.60 a front foot, while the second contract is estimated to cost \$5,500, or \$4.20 a front foot, making a total estimated cost to property owners between Chicago and Toledo Sts. of \$7.80.

Utica, N. Y.—Common council passed ordinance for the resurfacing of Main St., from John to 1st, and John St., from Main St. to the Erie canal. City engineer will prepare plans and estimates.

Akron, O.—City receiving bids in July for paving Cuyahoga St., to include 2,300 ft. roadway, 30 ft. wide, with 4,600 ft. sidewalks, 18 ft. wide. E. Zeisloft, City Engr.

Cleveland, O.—Contract shortly let grading, draining, curbing, repaving, widening and improving Prospect Ave., from East 30th to East 40th Sts. C. R. Hoffman, City Engr.

Cleveland, O.—City plans to open one-half mi. Torrens Ave., 60 ft. wide. C. R. Hoffman, City Engr.

Cincinnati, O.—County surveyor presented two estimates to the board of county commissioners for the improvement of Springdale road No. 96, where

considerable grading would be done; cost, \$27,069.95; resurfacing only, cost, \$19,055. For the repair of Euclid Ave., from Montgomery pike to Camargo pike, cost, \$16,824. Estimates for the repair of five roads were also presented to cost an aggregate of \$47,313.65. Of these the resurfacing of Harrison-New Hamilton road is estimated to cost \$8,480; Lawrenceburg-Harrison road, from Geist road to the Indiana State line, \$9,758; Harrison pike, between Cheviot and Harrison corporation line, \$9,851.40; Blue Rock No. 71, from Colerain pike to East Miami River road, \$6,345, and Gaines road, from Sheed road to Taylor creek and Springdale road, \$11,873.25.

Port Clinton, O.—The Camp Perry road between this city and camp is to be rebuilt at the expense of the state highway department.

Klamath Falls, Ore.—The house of representatives at Washington has voted \$423,000 for the Klamath irrigation project, and voted \$50,000 for roads in Crater Lake National Park.

Marshfield, Ore.—Proposal to change the project for improving North Broadway from Market Ave. to its intersection with North Front St. from bituminous paving to a concrete project all the way was suggested by City Engineer Heuperman.

Salem, Ore.—Government approval was received by the state highway commission for the issue of \$690,000 in road bonds, part of the \$2,000,000 which the state is allowed to issue this year under the \$6,000,000 bonding bill. Money will be for the completion of the road building program started by the commission last year. Approval also has been received for the Salem-Aurora section of the Pacific highway, a post road to be improved under the Bean-Barrett law. The cost will be \$348,000, half to be paid by the Government and half by the state. The forestry department of the Government is now advertising for bids for the construction of the Canyonville-Galesville road in Douglas county in what is known as the Cow Creek canyon. Total cost of this project will be \$157,000, the Government and the state each paying \$67,000 and Douglas county \$23,000.

Ebensburg, Pa.—Borough council has decided to pave Highland Ave. with brick paving block from Center St. to the borough line; also from the railroad crossing on the Cresson pike to the bridge at Lake Rowena. Both will be done with state aid.

Harrisburg, Pa.—State Highway Commissioner J. Denny O'Neill will open bids on July 11 for road improvement aggregating almost 15 miles, planned for seven counties—Washington, Greene, Mercer, Erie, Clarion, Cambria and Blair. The projects are as follows: Washington county, Allen township, state highway route 268, grading and drainage of 3,219 feet of roadway 33 feet wide. Greene county, Morgan and Franklin townships, state highway route 268, 18,083 feet of one-course plain cement concrete pavement and hillside vitrified block on a concrete foundation. Mercer county, Pine township, state highway route 73, 13,881 feet of one-course plain cement concrete pavement, 16 feet wide. Erie county, state highway route 84, Mill creek and Summit townships, 15,918 feet of one-course plain cement concrete pavement, or bituminous concrete, on a concrete foundation. Clarion county, Clarion borough, state highway route 65, 1,842 feet of vitrified block pavement, 16 and 35 feet wide. Cambria county, Croyle township, state highway route 275, 4,983 feet of either vitrified block pavement on a concrete base, or one-course plain cement concrete pavement, 16 feet wide. Blair county, Hollidaysburg borough, state highway route 160, 1,269 feet of one-course plain cement concrete pavement 30½ feet wide.

Harrisburg, Pa.—Forest county is entitled to receive \$4,802.91 of the 1911 cash road tax bonus which will be distributed among eligible second-class townships during the year. State Highway Commissioner J. Denny O'Neill has certified the following for payment: Barnett (Claringdon), Green (Nebraska), Harmony (West Hickory), Hickory (East Hickory), Howe (Lynch), Jenks (Marienville), Kingsley (Kelleetville), Tionesta (Tionesta).

Johnstown, Pa.—Council placed on the calendar an ordinance providing for the paving, grading and curbing of the Millcreek road between the lines dividing Westmont and the city of Johnstown.

Oil City, Pa.—Commission council passed the bill which provided for the ex-

tension of Mineral St. across the right of way of the Pennsylvania Railroad near the plant of the Pittsburgh Filter Co.

Wilkes-Barre, Pa.—County commissioners have reached an agreement with the officials of Courtdale borough by which the county will repair the Courtdale road between the Luzerne borough line and the Kingston township line, the borough to pay the county \$175 a year for five years.

Pawtucket, R. I.—Plans are now being completed for the repairing of Broadway from Cottage St. to Central Ave. An asphalt surface will be laid.

Austin, Tex.—The state board of education purchased road bonds amounting to \$20,000, of Freestone county road district No. 2.

Austin, Tex.—The attorney general approved the following bond issues: \$35,000 Titus county road district No. 5 and \$80,000 Morris county road district No. 1.

Dallas, Tex.—Dallas county property owners will pass upon a road bond issue of \$250,000 July 27 for the paving of the Fort Worth pike from Dallas to the Tarrant county line.

Gonzales, Tex.—Gonzales county receiving bids July 1, at 2.30 p. m., for \$60,000 road bonds of district No. 1, and for all of the \$60,000 issue, district No. 3. Construction, maintenance and operation of macadamized, graveled or paved roads and turnpikes. J. C. Romberg, county judge.

Gonzales, Tex.—Gonzales county receiving bids for \$75,000 road bonds of District No. 2, and for the \$10,000 issue, District No. 4, July 1, at 2.30 p. m.; construction, maintenance and operation of macadamized, graveled or paved roads and turnpikes. J. C. Romberg, county judge.

Ogden, Utah.—City commission deferred until next year action on the petition for the creation of a curb and gutter district on Madison Ave. between 28th and 29th Sts. Chief Engineer Joseph Tracy.

Provo, Utah.—The city commission has created sidewalk paving extension No. 6 in sidewalk paving district No. 11, consisting of the following sidewalks: East side of Ninth West St., between Center and First North; west side of Ninth West, between First and Fifth North; south side of Second North, between Seventh and Ninth West. The estimated cost of the improvement is \$1,071.55, or 74 cents per linear foot of abutting property.

Richmond, Va.—City Engineer Bolling has been ordered by the administrative board to make repairs on the government road; material will be purchased at once.

Seattle, Wash.—Resolution of intention to improve E. and N. 56th St., from Latona Ave. to Keystone Pl.; and Kenwood Pl., from N. 55th St. to E. Green Lake Way, by paving and fixing July 8, 1918, as a date for hearing. Adopted.

Seattle, Wash.—Board public works ordered sidewalks on Thirteenth Ave. W., et al.

Seattle, Wash.—Council provides for the improvement of Hudson St. from 35th to 39th Ave. S., by the construction of concrete walks. Mayor Ole Hanson.

Seattle, Wash.—State Highway Commissioner James Allen states that while the rising costs of materials and the difficulty experienced in obtaining same has considerably hindered road construction throughout the state, road construction work is progressing very satisfactorily. Many road building projects are being planned and it is expected that federal aid will be received on some of these when the approval of the plans by government engineers has been obtained. Listed in the road construction program on which it is probable bids will be called for later in the fall by the state highway commission are the following. The approximate cost of the different roads are shown: Creston to Wilbur, post road project No. 7, grading and graveling 8 1-3 miles; estimated cost, \$64,000. This project was advertised March 18 and again on May 6, 1918, but no bids were received. The board will probably readvertise this work in the fall. Spokane county line north; appropriation, \$20,000. This was shaped up for a federal aid post road project, but was rejected by the Government. Plans and specifications have been approved by the highway board and 4.25 miles grading and graveling, beginning at the Spokane county line and extending north, will be advertised in the fall. Laurier south; appropriation, \$30,000. As practically 80 per cent. of this

road is in the national forest, this department applied for forest aid to match with the state appropriation. Project was rejected by the Government, it being of no special benefit to the forest department. Work will be advertised about September. State road No. 10, Okanogan county; appropriation, \$20,000. Department has applied for federal aid to the amount of \$20,000, which will be used for the improvement of the Ophir grade and the Lauber gulch. Plans and specifications being prepared to submit to the Government engineers. State road No. 4, Okanogan county; appropriation, \$15,000. This project has been signed up with the forest department and work will probably be started this summer. State road No. 7, Blewett Pass; appropriation, \$18,500. State, \$12,000; Chelan county forest department, \$4,000. This project is going to be improved by the forestry department and the work will probably be started this summer. State road No. 18, Lewis county; appropriation, \$9,250. Location being made. Will apply for federal aid. Under-crossing Great Northern Ry. at Dean. Plans for this structure are being prepared by the Great Northern Ry. engineers and, if approved by the director general, work will be done this fall. Estimated cost, \$16,000. State, 60 per cent.; Great Northern Ry., 40 per cent.

Seattle, Wash.—Plans were received from City Engineer Dimock for the improvement of Holyoke Way et al. by grading, work estimated to cost \$18,000, and for the paving of Beacon Ave., cost \$15,200.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Wilmington, Del.—J. A. Clark, Wilmington, concrete, \$19,825; penetration method, \$22,136; F. Schwatke, Townsend, concrete, \$20,064; A. H. McDowell, Marshallton, concrete, \$21,054, penetration method, \$23,515. Low bidders building road through St. Georges township, New Castle county.

St. Petersburg, Fla.—E. W. Parker, 402 Curry Bldg., Tampa, for building 3 mi. drive on Gulf Coast, by W. D. McAdoo.

Chicago, Ill.—Following paving and curbing of streets let by city: *Amer. Asphalt Paving Co., 133 West Washington St., from Irving Park Blk. to Berceau Ave., involving 3,450 sq. yd. asphalt and 2,520 ft. concrete curb and gutter, \$2.19 per sq. yd.; Addison St., from Narragansett to Natrona Aves., 5,750 sq. yd. asphalt and 3,500 ft. concrete curb and gutter, \$2.29 per sq. yd.; Ridgeway Ave., from Milwaukee to Belmont Aves., 1,770 sq. yd. asphalt and 1,450 ft. concrete curb and gutter, \$2.16 per sq. yd.; Rockwell St., from Elston Ave. to Fletcher St., 3,200 sq. yd. asphalt and 2,260 ft. concrete curb and gutter, \$2.29 sq. yd.; *R. F. Conway Co., 133 West Washington St., Kenmore St., from Irving Park to Montrose St., and Euena St., from Sheridan Rd. to Kenmore St., 11,000 sq. yd. asphalt and 6,999 ft. concrete curb and gutter, \$2.65 per sq. yd.; *Farr Bros., 356 West 11th St., East 120th St., from State St. to Michigan Blk., 1,860 sq. yd. asphalt and 1,130 ft. concrete curb and gutter, \$1.65 per sq. yd.; *White Paving Co., 17 North La Salle St., portions of Artesian, Campbell, Maplewood, Rockwell, Talman, Washnetaw, Fairfield, Hollywood, Ardmore and Thorndale Sts., 67,000 sq. yd. asphalt and 48,800 ft. concrete curb and gutter, \$2.32 per sq. yd.; *Reidy & Callahan Constr. Co., 133 West Washington St., Wabash Ave., from Congress to 12th St., 15,600 sq. yd. wood block, \$5.36 per sq. yd.

Chicago, Ill.—The following low bids received for street alterations and paving Michigan Ave., from Ohio St. to Chicago Ave., and Ohio St., from Rush to St. Clair Sts., involving 10,600 cu. yd. excav., 150 cu. yd. 1-2-4 concrete, 1,200 cu. yd. 1-3-5 concrete, 4,600 ft. curb and gutter, 100 ft. straight curb, 100 sq. yd. new granite pavement, 17,500 sq. yd. asphalt pavement, 2-in. top, 1½-in. binder, 50,000 sq. ft. sidewalk, 1,800 ft. 12-in. and 100 ft. 18-in. tile pipe sewer, 15,000 lb. new castings for manholes, catch-basins, etc., and 10,000 bricks for masonry, from White Paving Co., 17 North La Salle St., \$153,992; Amer. Asphalt Paving Co., 133 West Washington St., \$160,120.

Chicago, Ill.—R. F. Conway & Co., 133 West Washington St., (a) \$9,157; (b) \$6,900; Amer. Asphalt Paving Co., 133 West Washington St., (a) \$9,201; (b) \$6,943; White Paving Co., 17 North La Salle St.,

(a) \$9,242; (b) \$7,067. Low bidders for grading, paving and curbing (a) Chase Ave., from Ridge road to Robey St., involving 900 cu. yd. grading, 1,800 sq. yd. asphalt, 560 sq. yd. brick block and 1,720 ft. concrete curb and gutter; (b) West 37th Pl., from Ashland Ave. to Paulina St., 450 cu. yd. grading, 2,000 sq. yd. asphalt on 6-in. concrete base and 1,280 ft. concrete curb and gutter. Board local impvts.

Oak Park, Ill.—*Guy & McClintock Co., 246 Lake St., Oak Park, for constructing 27,300 sq. ft. of Portland cement sidewalk at fifteen cents per sq. ft., by village. W. F. Sargent, engineer. B. C. Brandstadt, secretary.

Dubuque, Ia.—*Even Ulrich Co., for constructing concrete gutters on Seventeenth St., from railroad tracks to Maple St.; 19½ cents per sq. ft.

Sioux City, Ia.—*P. C. Hauson & Son, 1422 Court St., for laying curb and gutter. Paul J. Wells, clerk.

Louisville, Ky.—*Bickel Asphalt Paving Co., 1601 South 6th St., \$5,911 and \$9,905, respectively, for paving Floyd St. from Magnolia to Burnett St. and Walnut St. from Brook to Preston Sts.; Breckenridge St. from 1st to 2nd Sts., and Burnett St. from 1st to Preston Sts., to *Louisville Asphalt Co., Louisville, \$3,533 and \$13,122; 38th St. from Bway to first alley south of Chestnut St. and 1st St., from Jefferson to Main Sts., to H. St. and 1st St., from Jefferson to Main Sts., to *H. Bickel Co., 443 Garden St., \$18,408 and \$6,083. Board of Public Wks.

Boston, Mass.—Warren Bros., 142 Berkeley St., (a) bitulithic, \$14,770, fibertine, \$14,674; Bermudez Co., 246 1st St., (a) topeka, \$15,161; B. E. Grant, 27 School St., (a) topeka \$14,673, (b) \$24,571; J. Doherty, Boston, (b) \$26,577, (c) \$38,376; D. M. Briggs & Co., Boston, (b) \$29,535; Simpson Bros. Corp., 166 Devonshire St., (c) \$41,252; J. E. Quinn, 816 A. O. S. Bldg., (c) \$43,426. Low bids for paving (a) Park St. from Tremont to Beacon Sts., Somerset St. from Boylston St. to Ashburton Pl., Tremont St. from Boylston to Common Sts., bitulithic, topeka, fibertine or granite block, (b) Dorchester Ave. from Freeport to Park Sts., Dorchester, granite block (c) Dartmouth St. from Tiemont to Stuart Sts., granite block from.—Board of Public Wks.

Boston, Mass.—J. Doherty, 133 Calumet St., Roxbury (Boston P. O.), low bidder for paving Dartmouth St. from Tremont to Stuart Sts., granite block, about \$38,375.—Board of Public Wks.

Boston, Mass.—*Coleman Bros. Corp., Chelsea, for paving Clinton, Cross and Mercantile Sts., granite blocks, \$32,382.

Boston, Mass.—*Indiana Refining Co., 170 Summer St., for furnishing 100,000 gal. 35-40 asphaltic road oil, \$0.14 f. o. b. Boston.

Boston, Mass.—*Simpson Bros. Corp., 166 Devonshire St., for paving Sudbury St. from Court to Merrimac Sts., granite block, at \$18,318. Board of public works.

Holyoke, Mass.—*Daniel O'Connell & Sons, 480 Hampden St., at \$12,400 for paving Dwight St. between Elm St. and Whitney Ave. City council.

Litchfield, Minn.—*Russell Grader Mfg. Co., 2005 University Ave., S. E., Minneapolis, for elevating grader by Meeker county. A. O. Palmquist, county auditor.

Springfield, Mo.—*Republic Constr. Co., 1614 Merchants Bank, Indianapolis, for concrete work on bridges Nos. 1, 2, 3, 4, 5 and 6 about \$110,000.

Jersey City, N. J.—The Hudson County board of freeholders for the improvement of the Newark turnpike to the *Stillman-Delehanty-Ferris Company of this city, \$1,297,000, granite block.

Rutherford, N. J.—*Antonio Borgi, of Wood Ridge, for the completion of the Carlton Ave. curb and gutter, for \$1,856. Mayor Westbrook.

Rutherford, N. J.—*Frank Van Roden, for \$6,967, for the resurfacing and curbing and guttering of Washington and Lincoln Pl. The curbing and guttering work represents 2,856 of the foregoing amount. Mayor Westbrook.

New York, N. Y.—The following low bids received June 13 for regulating and repaving with asphalt blocks on 6 in. concrete base, (a) Washington Ave. to Graham Ave., 1st Ward, (b) 6th St. West Blvd. and North Blvd. from 1st to College Aves., 4th Ward; (c) Rockaway Beach Blvd. from Eastern to Remsen Ave., 5th Ward; (d) Webster Ave. from west of Hopkins Ave. to 100 ft. east of Sunnich St., 1st Ward; (e) Grand Ave. from Hopkins to Crescent Sts., 1st Ward; from Hastings Pavement Co., 25 Broad St., New York City, (a) \$20,859; (d) \$14,540; (e) \$32,335; Cleveland Trinidad

Paving Co., Main St., Flushing, L. I., (b) \$52,332; Borough Asphalt Co., 1301 Metropolitan Ave., Brooklyn, (b) \$54,225; Uvalde Asphalt Paving Co., 1 Bway, New York City, (b) \$55,525; H. J. Mullen Contg. Co., Inc., Fulton St., Jamaica, L. I., (c) \$63,998; E. W. Fitzpatrick, 244 Jackson Ave., Long Island City, (c) \$68,187; Peace Bros., 20 Main St., Flushing, (c) \$72,191. M. E. Connolly, borough president (Queens Boro.).

New York, N. Y.—Leonard Paving Co., 233 Bway, New York City, (a) \$54,778; (d) \$5,065; (e) \$32,511; (f) \$9,636; F. W. Fitzpatrick, 244 Jackson Ave., Long Island City, (b) \$2,011; R. A. Hess, Corona, (b) \$2,310; F. Soviers, 174 4th St., Union Course, L. I., (b) \$2,429; Sicilian Asphalt Paving Co., 41 Park Row, New York City, (c) \$10,358; Borough Asphalt Paving Co., 1301 Metropolitan Ave., Brooklyn, (c) \$10,641; Uvalde Asphalt Paving Co., 1 Broadway, New York City, (c) \$10,826; Hastings Pavement Co., 25 Broad St., New York City, (g) \$5,375; (h) \$11,994. Low bidders June 10 for regulating, paving and curbing (a) Myrtle Ave. from Lincoln to Jamaica Aves., 4th Ward, (b) 88th Ave. (Maple St.) from 102d to 104th Sts., 4th Ward, (c) Forest Ave. from Woodbine St. to Putnam Ave.; (d) 4th St. from Vernon to Jackson Aves., 1st Ward; (e) Fulton Ave. and Main St. from Stevens St. to Van Alst Ave., 1st Ward; (f) Fulton Ave. from Boulevard to Stevens St., 1st Ward; (g) Marc Pl. from Grand to Newton Aves., 1st Ward; (h) Carver St. and Flushing to Newton Ave., 1st Ward. M. E. Connolly, borough president (Queens Boro.).

New York, N. Y.—Cleveland Trinidad Paving Co., Main St., Flushing, L. I., \$26,268; \$29,241; \$15,032 and \$45,201 respectively, for repaving with sheet asphalt on concrete foundation, roadway, 28th St. from 8th to 10th Ave.; 51st St. from 8th to 9th Aves., and 10th to 11th Aves.; 20th St. from 7th to 8th Aves., and 48th St. from 8th to 11th Aves.; 5th St. from Ave. D to C, to *Uvalde Asphalt Paving Co., 1 Bway, \$12,789; 115th St. from Pleasant to 2d Aves., to *Davney Asphalt Co., 1170 Bway, \$23,400. F. L. Dowling, borough president.

New York, N. Y.—*W. J. Fitzgerald, 547 West 45th St., \$21,799, \$22,298, \$10,848, \$3,154, \$16,622, \$5,101 and \$22,820 respectively, for regulating and repaving with granite block pavement on concrete foundation West 22d St. from 10th to 11th Aves., 46th St., from 10th to 11th Aves.; 130th St., from Lexington to Park Aves.; Catherine St., from Oak to Monroe Sts.; Bleeker St., from Bowery to Lafayette St.; Greenwich Ave. from 7th Ave. to Bank St.; 18th St., from 7th to 8th Aves. F. L. Dowling, borough president.

New York, N. Y.—*Uvalde Asphalt Paving Co., 1 Broadway, at \$8,873, for regulating and grading Riverside Drive Service St. from 139th to 142nd Sts. sheet asphalt on concrete base; Service St. from 165th to 177th Sts., to *J. Duffy, 599 East 132nd St., \$80,931; furnishing 6,500 cu. yd. binder stone, to *Upper Hudson Stone Co., 26 Cortland St., \$12,350. F. L. Dowling, Boro. Pres.

Portland, Ore.—Bids were opened by the dock commission for macadamizing or surfacing with concrete a section of road leading from the county road to the St. Johns municipal terminal. The Warren Construction Co. proposed that it be paid a rental for its equipment and 15 per cent. above cost, while the City Motor Trucking Co. offered to do the work at cost plus 10 per cent. The commission is opposed to a cost-plus arrangement and may call for new tenders.

Philadelphia, Pa.—Average unit low bids. Letting June 11. Total amount of all low bids, \$229,954.84. Schedule "A." Grading. Total amount of low bids, \$7,143.62. 7,574 cubic yards of excavation. Average price per cu. yd., \$1.095. Low bidders: Thomas P. Lee, 5629 Cherry St.; Ira K. Davis, 20th and Spencer Sts. Schedule "B." Asphalt Paving. Total amount of low bids, \$42,542.05. Asphalt paving (including 6-inch concrete base), average price of \$3.30 per sq. yd.; vitrified block gutter paving (including 6-inch concrete base), average price of \$4.65 per sq. yd. Low bidder: Eastern Paving Co., Colonial Trust Bldg. Schedule "C." Asphalt Renaving. Total amount of low bids, \$11,915.38. Asphalt binder and surface (including 6-inch concrete base), average price of \$2.95 per sq. yd.; granite block repaving between rails (including 6-inch concrete base), average price of \$6.07 per sq. yd.; disposal of existing granite block paving (including subgrading), average price of 80 cents per sq. yd. Low bid-

der: Barber Asphalt Paving Co., 239 N. 30th St. Schedule "D," Curb and Footway Work (cost to be paid by city). Total amount of low bids, \$10,329.75. Low bidder: George Gray, 4330 Factory St. Schedule "E," Demolition and Removal of Buildings on Line of Parkway (between 17th and 18th Sts.). Total amount of bid (pay to city), \$4,585. Low bidder: Three Holders Wrecking Co., 263 S. 8th St. Schedule "F," Improvement of Parkway (between 18th and 20th Sts.). Total amount of low bids, \$146,791.04. Low bidder: John Meehan's Sons, 915 W. Dauphin St. Schedule "G," Repairing and Painting Bridges. Total amount of low bids, \$11,233. Low bidders: William A. Mundy, 228 S. Alder St.; M. & J. B. McHugh, 892 N. Market St. Schedule "H," Furnishing and Placing Reinforced Concrete Drain (all bids rejected). George E. Datesman, Director, Department of Public Works; Fred C. Dunlap, Chief of Bureau.

Tazewell, Va.—Rosenbaum & Franklin, Pocahontas, for building 9 mi. macadam pike in Abbs Valley, about \$45,000. Tazewell county.

Seattle, Wash.—V. Bressi, 853 Rainier Ave., for the paving of Howard Ave. No. et al., \$29,078.75.

Cap de la Madeleine, Que.—O. Prenovost, by the town council, for the construction of concrete sidewalks.

Tilbury, Ont.—Scratch & Link, Leamington, for paving, at \$7,000.

SEWERAGE AND SANITATION

Los Angeles, Cal.—City Engineer instructed to prepare ordinance for the sewerage of Almaden Drive between Phillips Way and 400 feet westerly.

Ansonia, Conn.—Bids soon asked for storm water sewer, Elm St., \$2,500. V. B. Clark, city engr., City Hall.

Washington, Ind.—Plans to build 24-in. tile sewer in Fourth St. H. F. O'Neale, city engineer.

Lawrence, Ia.—Preliminary plans in progress, sanitary sewer system. C. H. Currie, engr., Webster City, Ia. Geo. Strickland, mayor.

Detroit, Mich.—As a war measure the committee on sewers has appropriated \$9,000 for the construction of a sewer in Colby street to connect with the Russell trunk sewer, draining the territory bounded by the Grand Trunk railroad, the boulevard, Orleans street and Russell street.

Rochester, Mich.—Bids soon called for building 1,000 ft. new sidewalk, 1,188 lin. ft. storm sewer at crack in Wilcox St. Southern Mich. Engr. Co., engr., Royal Oak Sav. Bank Bldg., Royal Oak, Mich.

Chatfield, Minn.—City rejected all bids for sewer connections. T. W. Shimer, city recorder.

Foley, Minn.—City plans sewer system, \$2,000; cast iron, 6, 8 and 10-in. pipe, 6, 400 ft. Geo. E. Rice, mayor.

Newark, N. J.—Board of Commissioners adopted June 20 resolution of intention to order the construction of an 8-in. pipe sewer to be used for house sewage only, in Lindsley Ave., between Alexander St. and Brookdale Ave., with a branch in Sunset Ave. from Lindsley Ave. about 320 ft. northerly. M. B. Sherred, chief engr., Dept. of Streets and Public Improvements.

Norristown, N. J.—Plans drawn sewage system \$25,000, 3 sand filters, 2,000 ft. 18-in. vit. tile. A. S. Wilson, engr., Trust Co. bldg.

Brooklyn, N. Y.—Board of estimates referred the following Queens matters to the committee on finance and budget: Sewer in Rust St., from James St. to Flushing Ave., and in Flushing Ave., Hebbard St. Mount Olivet Ave. and Broad St., Maspeth; sewer in Lyon Ave., from Ditmars Ave. to Gilmore St.; Butler St., from Lyon Ave. to Banks Ave.; Curtis St., from Lyon Ave. to Banks Ave.; Ericson St., from Lyon Ave. to Banks Ave., and Gilmore St. from Lyon Ave. to Astoria Ave., East Elmhurst; paving Abingdon road from Lefferts Ave. to Brevoort St., Ridgewood and Woodhaven; paving Madison St. from a point 10 ft. east of Doubleday St. to Fremont St., Ridgewood; also the request of Borough President Connolly for the issue of bonds to provide \$100,000 for the completion of the Flushing refuse destructor.

Okmulgee, Okla.—C. W. McNear & Co., Chicago, successful bidders, sewer system improvement, bonds \$150,000. R. H. Jenness, commissioner of finance.

Carbondale, Pa.—City engineer Giles presented plans and profile for a sewage system to eliminate health menaces on Gravity, Mitchell and other small streets on the southerly side of Canaan street.

Carlisle, Pa.—Bids will be asked on repairing the sewerage disposal plant.

Chester, Pa.—Chester Ship Bldg. Co., soon ask bids building sewers and roads, 1 mi. macadam and terra cotta. Albright & Mebus, engr., 110 S. Broad St., Philadelphia, Pa.

Erie, Pa.—Street Director Elchhorn will introduce ordinances for the construction of sewers in 14th St. from Poplar to Liberty, and in Cottage Ave. from 21st St. to the Nickle Plate tracks.

Erie, Pa.—Capital Issues Committee of the War Finance Board has approved the issuing of \$100,000 of bonds for the improvement of Mill Creek.

Philadelphia, Pa.—Councils approved the appropriation of \$388,000 loan funds for the construction of a main sewer on Packer St. to provide sewage facilities for hundreds of houses that the Government plans building along the north side of Penrose Ferry road. The money is available from the \$42,000,000 loan for general purposes approved in June, 1916. Other bills of the utmost importance for the operation of the city government through the summer months provide transfers of funds totaling about \$600,000. A part of this money, taken from salary items, will be used in the purchase of supplies that are badly needed by departments and city institutions.

Philadelphia, Pa.—Sewer main 51st and Crays Ave., \$25,000; brick and stone, 437 ft. long. Chester E. Albright, engr., City Hall.

Woonsocket, R. I.—Mayor Archambault has approved a resolution appropriating \$4,000 for a sewer pump.

Sioux Falls, S. D.—About 300 ft. tile sewers, east side, no date set for entry. Walter Leyse, city clerk.

Austin, Tex.—City voted \$100,000 bonds for the erection of a sewerage disposal plant; work on the plant will begin as soon as a sufficient amount of the bonds has been sold. It is probable that that will be Aug. 1. Plans and specifications have not been accepted yet.

BIDS RECEIVED AND CONTRACTS AWARDED

(*Indicates Contracts Awarded.)

Torrington, Conn.—Eastern Clay Goods Co., 141 Milk St., Boston, Mass., for outfall sewer extension. Boro. Council, Carl B. Ekvall, clerk, Town Hall. C. A. Patterson, engr.

Waterbury, Conn.—R. D'Iro & Co., 88 East Main St., for building sewers in Beacher, Inglewood and Wildemere Aves. and Knoll St., about \$19,380. Board of Pub. Works.

Connorsville, Ind.—R. M. McConnell, Glenwood, Ind., for installing sewers. Common council, Wm. Mittle, city engr., City Hall.

Dubuque, Ia.—N. J. Staner, construction of Bee Branch storm sewer north from the end of present sewer at 28th St., a \$18.95 per lin. foot.

Horton, Kan.—McCoy & Taylor, Larned, Kan., for sewage disposal plant, city council. Horton, Black & Veatch, engr., 507 Interstate Bldg., Kansas City, Mo.

Independence, Kan.—C. C. Michael, for an extension to the sewer of city park, price \$1,895. City commissioners.

Wichita, Kan.—Geo. H. Siedhoff Constr. Co., 320 Finance Bldg., Kansas City, Mo., E. Skaer Apts., Wichita, at \$214,000. City council, E. A. Jones, engr.

Boston, Mass.—V. Grande, \$9,723; A. Baruffaldi, \$9,806; G. J. Ryan, \$10,566; low bidders installing sewers in Leverett street between Charles and Green streets. In Causeway St. between Leverett and Beverly Sts., low T. Coughlin, \$4,813; T. J. Ryan, \$6,607; Daddaris & Booth, \$7,239, all of Boston.

Lincoln, Neb.—W. S. Scott, Lincoln, for installing main sewer, 1,443 ft. 8-in. main.

Amsterdam, N. Y.—Nicholas Carbonelli, 14½ Bridge St., for surface sewers in Grand, Merrill and Milton Sts., 21st and 2nd Aves., vit. pipe. City council, E. H. Prentice, city engr., Bank Bldg.

New York, N. Y.—P. McGovern & Co., 50 East 42nd St., at \$942,047, only bid received June 11 for completing following sewers, former contract for which was abandoned: Westchester Ave. from existing sewer in Westchester Sq. to Blondell Ave.; Blondell Ave. from Westchester Ave. to Poplar St.; property of New York, New Haven & Hartford R. R., from Poplar St. to Sacket Ave.; Sacket Ave.

from Hering Ave. to Eastchester Rd.; Eastchester Rd. from Sacket to Seymour Aves.; Seymour Ave. from Eastchester Rd. to Allerton Ave.; Allerton Ave. from Seymour to Wilson Aves.; Wilson Ave., from Allerton to Adea Aves.; Adea Ave., from Wilton to Throop Aves.; Throop Ave. from Adea to Burke Aves.; Burke Ave. from Throop Ave. to White Plains Rd. H. Bruckner, president, borough of Bronx.

North Tonawanda, N. Y.—Paul Mikeasz for installing sewer in Whitney St.—Board of Public Works, Carl L. Oelkers, engr., City Hall.

Philadelphia, Pa.—Edward F. Bennis, of Philadelphia, for the laying of sewers in the Carroll tract, Fortieth Ward, where 500 houses are being built for Hog Island workmen, by Rear Admiral Bowles, assistant general manager of the Emergency Fleet Corporation.

New Lisbon, Wis.—G. W. Leisman, Fort Atkinson, for installing sewers.

Oshkosh, Wis.—Chris Johnson, for the construction of sewers in district No. 1 of the Second addition to Riverside cemetery, at \$2,921.75.

Wauwatosa, Wis.—F. E. Kaninski, for 1,150 lin. ft. 24-in. pipe sewer, 320 lin. ft. 21-in. sewer, 600 ft. 18-in., 350 lin. ft. 12-in. pipe, 13 standard manholes, 12 standard catch basins. A. V. Brigham, secretary.

WATER SUPPLY

Monrovia, Cal.—City clerk L. P. Black will receive sealed bids until 7.30 p. m., July 1, for \$42,500 6 per cent. 1-40-year serial water bonds.

Palo Alto, Cal.—City council authorized the board of public works to proceed with the project of installing another pumping station. This will include the acquisition of a small lot, the boring of a well and the purchase and placing of a pump. The pump to be installed will have a capacity of 800 gallons a minute. The cost of the station complete will be \$9,000.

Teton, Ida.—Keeler Bros., of Denver, successful bidder for an issue water plant, bonds \$15,000. Geo. H. Lowe, village attorney.

Jacksonville, Ill.—City voted \$75,000 bonds to erect a water system.

Bicknell, Ind.—The Bicknell Water Works Company is planning to extend water mains to Aliceville and Johnstown mining camps south of this city. Both the residents and the mines will be supplied.

Ayrshire, Ia.—For water works system city voted \$10,000 bonds.

Augusta, Me.—The public utility commission rendered a decision authorizing the Kittery Water District to issue its bonds of the aggregate par value of \$200,000.

Minneapolis, Minn.—Will buy 69,850 water meters and put in 69,000 house connections. W. R. Young, registrar.

Minneapolis, Minn.—Will lay about 15 miles of cast iron pipe 6-in. to 12-in. and may buy a motor truck. W. R. Young, registrar.

Rich Hill, Mo.—For improvement to water works and electric light plant city voted \$14,000 bonds.

Gallup, N. Mex.—Town has sold to Keeler Bros., of Denver, water works bonds, \$80,000. N. A. Walden, clerk.

Boonton, N. J.—Water bonds to the amount \$170,000 was sold to J. S. Rippe & Co., of Newark, taking \$158,000.

Rutherford, N. J.—The Hackensack Water Company was given the right to extend its mains on Poplar St.

Amsterdam, N. Y.—Resolution approved by council for the issuance \$53,000 water system bonds.

Canton, N. Y.—Village has voted \$55,000 water system bonds.

Peekskill, N. Y.—H. W. Taylor, 26 Cortlandt St., New York City, consulting engineer, village plans to install complete new pumping apparatus.

Watertown, N. Y.—City will vote July 9 on the question of issuing \$170,000 bonds for the development of the city water power plant. Mayor Breen.

Raleigh, N. C.—Sealed proposals will be received by the commissioners of the city until 4 p. m., July 1, for the following: Furnishing and laying 3,300 ft. of 24-in. or 22-in. wood pipe 43 lbs. pressure; 1 motor-driven centrifugal pump 4,000,000 gallon capacity; 1 steam turbine-driven centrifugal pump, 5,000 gal-

lons capacity; 6 tons class A, 16-in. water pipe; 13 tons class A, 18-in. water pipe; 21 tons class A, 24-in. water pipe; 500,000 gallon concrete filter. James I. Johnson, mayor; E. B. Bain, supt.; Gilbert C. White, engr., Durham, N. C.

Marietta, O.—Service director was authorized to advertise for bids for the purchase of 300,000 lbs. of sulphate of iron for use in the city water works department.

Okmulgee, Okla.—C. W. McNear & Co., of Chicago, successful bidders water works system bonds, \$335,000. R. H. Jenness, commissioner of finance.

Amity, Ore.—City voted water works bonds, \$5,000. W. R. Osborn, city recorder.

North Bend, Ore.—Council discussed the proposed salt water main fire protection system. In addition to the system previously outlined, it was suggested that a supply tank be built on the Porter Hill. This would add materially to the cost, the original amount being about \$25,000.

Mount Union, Pa.—Rudolph Kleybolte Co., of Cincinnati, purchased the water bonds to the amount \$60,000.

Austin, Tex.—The attorney general approved \$400,000 of waterworks bonds for the city of Corsicana.

San Angelo, Tex.—U. M. Ehlers, state sanitary engineer, at Austin, has recommended to the city commission the construction of a modern rapid sand filter and disinfection plant by the San Angelo Water, Light & Power Co. in order that the city water supply may be free from impurities that endanger public health. A modern plant of this character will, under skillful operation, remove about 99.5 per cent. of the impurities. Cost of the entire plant for treating 2,000,000 gallons per day (under normal conditions) would be approximately between \$35,000 and \$45,000. The cost of the operation may vary from \$2 to \$10 per million gallons treated. C. L. Wells, city manager.

Charlestown, W. Va.—Special waterworks investigation committee in a report to council, recommends the installation of an adequate purification plant, including the necessary sedimentation basins, filter beds and clear wells, of not less than 12,000,000 gallons in capacity and the installation of a modern reservoir of proper capacity to properly supply the present needs of that section of the city lying on the south side of Kanawha river.

Laramie, Wyo.—For furnishing the following materials: 5,300 ft. of 12-in., 75 ft. head machine, banded redwood pipes, and flanged tees, 12-in. gate valves, air valves and cast-iron collars, asphaltum, etc. All bids were rejected by city council June 4.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Whittier, Cal.—Neptune Meter Co., this city, for furnishing 1,000 meters.

Washington, D. C.—De Laval Steam Turbine Co., New York City, for furnishing steam driven centrifugal pump outfit for water department to have a daily capacity of 15,000,000 gallons, to be installed in the Bryant St. Station in connection with the filtration plant, at \$37,950.

Pensacola, Fla.—Layne & Bowser, of Memphis, for the installation of an additional well at the municipal pumping station.

Moline, Ill.—Frazier Davis Constr. Co., Rock Island, Ill., at \$4,020, and Moline Htg. & Const. Co., Moline, at \$13,769 for water mains. Board of local improvements, S. Payton, engr.

North Utica, Ill.—J. C. Brooks & Sons, Jackson, Mich., for water mains at \$38,212. Village council, J. M. Hannum, mayor.

Hudson, Mass.—Alexander McKenzie, 8 Emerson St., Somerville, Mass., for relaying water pipe in Hudson at \$5,000. Dept. of Water Works, C. H. Stone, supt., and board of public works.

Galveston, Tex.—Black Hardware Co., this city, for furnishing three 30-in. gate valves for 120-lb. working pressure, at \$2,175.

Fort Worth, Tex.—Westinghouse, Church & Kerr, New York City, for settling and aerating basins at \$106,000.

Oconomowoc, Wis.—Lehman Bros., this city, was low bidder for laying water mains, at \$1,920.

Chicoitum, Can.—L. Laberge, this city, for installing water works system at \$55,000.

Sault Ste. Marie, Ont.—Bawden Pump Co., Toronto, for one pumping set, and the Canadian Allis-Chalmers, Ltd., Tor-

ono, for two sets. Each set consists of a 2,500 Imperial gallon per minute domestic pump, and a 2,500 Imperial gallon per minute booster pump, complete with motors.

LIGHTING AND POWER

Duluth, Minn.—Purchasing site for Zenith Telephone Co., at \$35,000, authorized by city council.

Rich Hill, Mo.—See "Water Supply."

Jersey City, N. J.—Hudson County Board of Freeholders engaged William W. Law of New York as consulting engineer to supervise the erection of a central power plant for the lighting of the county roads and the lighting and heating of the county institutions.

Brooklyn, N. Y.—Justice McAvoy in the Supreme Court granted a writ of mandamus, compelling the New York and Queens Gas Company to extend its mains and service to Douglaston, Douglas Manor and Little Neck.

New York, N. Y.—New York Edison Co. is planning for the erection of a large new power plant; has purchased site on 133d St., near Locust Ave.

Harrisburg, Pa.—Council passed ordinance to place lights in the following streets; Cameron and Nagle; 17th, between Catherine and the Philadelphia and Reading Railway; Derry and Dunkle; Cernon, between 14th and 15th; 5th and Hunter; 14th and Market; 12th and Keller; Mahantongo and Jefferson; Division and Jefferson; Cameron above Barryhill; 10th, between Market and Walnut; incandescent electric lights of 100 candlepower at 227 South Summit; Reservoir and Regina; Division, between 6th and Jefferson; Cherry and River.

Reading, Pa.—The Metropolitan Edison Co. has filed notice with the public service commission a bond issue for \$61,500 to provide for extensions, improvements, etc.

Providence, R. I.—An issue of three-year 7 per cent. convertible notes to the amount of \$1,700,000 was voted at a special meeting of the stockholders of the Narragansett Electric Lighting Company. The new securities are subject to the approval of the capital issues committee of the Federal Reserve Board. Following obligations will be met: Paying \$600,000 for such improvement as the new boiler house, the new transmission lines to Westerly and cables to the North End and East Providence, and the additional improvements, which will augment the company's revenues, includes four new boilers of 600 horse power each, 86,000-volt transmission line over the river on poles 190 feet high, north of Fox Point to India Point and East Providence, and a transmission line from Swansea to Warren for increasing the power loads in that section.

Kilgore, Tex.—The plant of the Kilgore Electric Light & Power Co. was destroyed by fire.

BIDS RECEIVED AND CONTRACTS AWARDED.

Spokane, Wash.—Spokane Heat, Light and Power Company only bidder to heat the city hall and furnish the building with hot water for the year, beginning July 23; 72 cents per 1,000 pounds of steam used; estimated will cost approximately \$7,500.

FIRE

East Hartford, Conn.—Has voted to purchase a diaphone fire alarm system.

Cherryfield, Me.—May vote funds to purchase fire apparatus.

Pineville, Ky.—Chemical fire engine, hand extinguishers and fire hose will be purchased by council.

Kalamazoo, Mich.—Will purchase motor fire engine. C. L. Miller, acting city manager.

Secaucus, N. J.—Contemplates purchasing new motor pumping engine.

Amsterdam, N. Y.—Resolutions approved by council for the issuance \$65,000 fire department bonds.

Mamaroneck, N. Y.—H. A. Kohler & Co., of New York, were the success-

ful bidders. Fire apparatus bonds \$10,000. George W. Burton, town supervisor.

Sidney, N. Y.—Citizens will vote July 2 on issuing fire engine and hose bonds, \$12,000.

Utica, N. Y.—The commissioner of public safety was authorized to purchase in the open market fire alarm boxes, gasoline tanks, a punch system and equipment.

Lewisburg, O.—Village clerk H. D. Grube receiving bids July 16 fire engine bonds, \$1,000.

Aberdeen, Ore.—An emergency ordinance calling for the erection and equipping of a sub fire station in the west end near the Grays Harbor Motorship corporation yard, was passed. The new hose house will be of the bungalow type and cost about \$2,000. A pumper which will cost \$7,500 will be installed and hose and other minor equipment purchased.

Tacoma, Wash.—City plans to build a smaller fire station for South Tacoma. The present building being too large will be sold June 26.

Rinelander, Wis.—Contemplates purchasing 1,000 ft. fire hose.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Hartford, Conn.—American Steel and Wire Company, Western Electric Company, Standard Underground Cable Company, bidders for furnishing 6,000 ft. wire cable for fire alarm system.

New Castle, Del.—The following bids for motor fire apparatus from Ahrens-Fox Co., Sea Grove Co., American La France Fire Engine Co.

Pensacola, Fla.—City purchased a combination truck, engine and hose wagon from the American La France Company.

Joplin, Mo.—City council voted to accept a proposal of the White Motor Fire Apparatus Company for the purchase of two pump machines. The trucks each will have a pumping capacity of 500 gallons of water per minute and will have a guaranteed horse power of ninety. J. F. Osborne, mayor.

BRIDGES

Washington, D. C.—See "Streets and Roads."

St. Augustine, Fla.—A proposition for a new bridge across Durbin Creek at section 36 in township 4, range 27 east to connect St. John and Duval counties was submitted to the board of St. Johns county commissioners. Road Supt. Mattox.

Goshen, Ind.—An \$80,000 issue of Elkhart county bonds were sold by Auditor A. R. Bemenderfer to the First National bank of Elkhart for \$1,264 premium. Sixty-four thousand dollars of this sum will be used for the construction of a new bridge over the St. Joseph river at Elkhart avenue in Elkhart. The contract was awarded to the Elkhart Bridge & Iron Co. some time ago by board of county commissioners. The remainder of the money will be used for improvements at the county infirmary and jail.

St. Paul, Minn.—A \$75,000 viaduct will be built in stock yards in this city.

Wentworth, N. C.—William Young, clerk of the commissioners of Rockingham county, will receive sealed bids until noon July 12 for \$225,000 6 per cent. semi-annual 16-year average bridge bonds.

Ashtabula, O.—Government official has recommended a bridge built over the river near the ship yard for the accommodations of ship yard workers living east of the river.

Lima, O.—City will abolish danger corner at East Elm by building a new bridge to straighten the street.

Harrisburg, Pa.—Among the applications considered by the State Water Supply Commission, Dauphin county commissions to construct a reinforced concrete arch highway bridge across the Swatara creek, known as Dauphin County Bridge No. 125, near Hummelstown. Others considered: One report upon a dam, one application for the construction of a dam, one application for the construction of a coal trestle, one application for the construction of a county bridge and three applications for the construction of private bridges.

Sherman, Tex.—A modern concrete bridge will be built on West Houston street over Post Oak Creek in this city at a cost of \$8,000.

Norfolk, Va.—City and federal officials are planning to erect a bridge ten feet wide to the end of the wharf on High St., and to erect a substantial house on the end of the bridge in which persons waiting for boats may seek shelter during inclement weather. The city's share of the expense will be about \$200, it is estimated.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Terre Haute, Ind.—County commissioners received bid on the Hyde bridge in Lost Creek township, Allen & Lisby, of Greencastle, Ind., \$7,800, 70 cents a lineal foot for piling, and P. O'Leary & Son, of Terre Haute, \$7,846, \$1.10 a lineal foot for piling.

Concordia, Kan.—*Western Bridge Co., Harrisonville, Md., building 7 bridges, \$25,164. *J. Bohannon, Glasco, 3 bridges, \$5,643. Cloud county.

Jefferson City, Mo.—*Pope Construction Co., this city, for excavation, embankment, ditching, rolling and graveiling, pipe culverts and head walls, at \$4,480.

Kansas City, Mo.—*Pioneer Construction Co., Chicago, Ill., for furnishing all material and constructing reinforced concrete bridge on Raytown road over Blue River, at \$55,538.

Chittanooga, N. Y.—The following low bids received building bridge over Chittanooga creek, Sullivan township, Madison county, from W. T. Taylor, Chittanooga, \$15,291; C. Shret, Chittanooga, \$15,291; L. Tibbets, Oneida, \$15,291; Newport Constr. Co., 200 North Main St.,

Herkimer, \$15,777. State Highway Commission, 55 Lancaster St., Albany.

Astoria, Ore.—For the building of new bridges in the county, by the county court. One over Behnke creek at Jewell, *Jewell Lumber Co., for \$3,621.58. The *Portland Bridge & Iron Co., over the Skipanon on the Warrenton cutoff, \$5,077, and over the Nehalem river near Elsie, \$11,100.

Wilkes-Barre, Pa.—*G. W. Rockwell, for building the following bridges: Two in Hollenback township, for \$650 and \$890; one in Black Creek township, for \$1,175; two in Fairmount township, for \$725 and \$710; one in Lake township, for \$550; two in Dorrance township, for \$650 and \$850; *E. W. Connolly, two bridges in Dallas township, for \$894 and \$894; one in Kingston township for \$895; *M. J. Maitly, 1 in Kingston twp. for \$810; 2 in Wright township, for \$1,650 and \$800; *Boyle Construction Co., one in Wright township, for \$1,170; *G. W. Rockwell, one bridge in Hollenback township, for \$450; *Products Sales Co., for furnishing steel for these bridges for \$587, by county commissioners.

North Bend, Wash.—Board of King county commissioners to *C. C. Snyder & Co., Pacific Block (formerly C. Geske & Co.), to erect proposed steel bridge across south fork of the Snoqualmie river at North Bend, \$3,132.

Waterville, Wash.—*Davenport & Picken, Tonasket, Wash., for constructing 6 bent frame trestle bridge over a gulch leading to the Columbia River, at \$1,050.

Waterville, Wash.—*I. J. Bailey, Wenatchee, Wash., for constructing a 40-ft. concrete arch bridge across Crobaley Creek near Oconto, at \$4,939.

Peel Township, Ont.—*John Tilker, of Harrison, for building concrete arch bridge at \$5,300, by township council.

Vancouver, B. C.—For the erection of the Howe truss span in the Fraser Ave.

bridge over the Fraser river at South Vancouver by the government to *W. Greenless, 407 Cordova W., \$3,650.

MISCELLANEOUS

Bekeley, Cal.—During the coming fiscal year the city will purchase gravel in the open market for use upon the streets and highways of the city, according to action taken by the city council when all bids offered for supplying gravel, crushed rock and screenings to the city were rejected. The price asked was too high.

San Diego, Cal.—An extensive system of drainage for property owners on Rosecrans St. at La Playa and Roseville has been submitted by the city engineering department to the council, the estimate of the total cost being \$28,675. It is proposed to establish culverts and drainage pipes on Canyon road from Akron street to the mean high tide line to cost \$23,829; to build culverts, etc., at Goethe and Rosecrans Sts. to cost \$630 and to put in culverts and pipe on Macauley St. from Evergreen to Rosecrans to cost \$4,215. George Cromwell, city engr.

Washington, D. C.—(Bureau of Foreign and Domestic Commerce, Department of Commerce).—A man in Argentina wishes to purchase machinery and all kinds of materials necessary for the manufacture of electric lamps, especially copper wire of 35 mm., 50 mm., and 60 mm.; also tungsten filament wire, leading wire, anchor support, phosphoric acid, acid for polishing lamps and for glazing same. Correspondence should be in French, Italian, or Spanish. References. Refer to Opportunity No. 27098.

TOO LATE FOR CLASSIFICATION

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS.				
Mass., Boston		Noon, July	1..Granite block pavement	Thos. F. Sullivan, Com. of Pub. Wks.
Ill., Champaign		10 a.m., July	1..Paving with brick	J. E. Pearman, City Clk.
Ia., Des Moines		9 a.m., July	1..Curbing on a number of streets	Supt. of Streets and Public Improvements.
Ia., Davenport		2 p.m., July	2..Excavating, paving and curbing, including vitrified beveled brick on 5-inch concrete foundation	J. W. Crowley, Chrm. Bd. of Pub. Wks.
N. Y., New York		2 p.m., July	8..Regulating and repaving with granite block on concrete foundation; also with sheet asphalt	Frank L. Dowling, Boro. Pres. Manhattan.
Ind., South Bend		10 a.m., July	9..Grading street	Bd. of Pub. Wks.
SEWERAGE.				
Ia., Davenport		2 p.m., July	2..Constructing sewers	J. W. Crowley, Com. of Pub. Wks.
Mass., Boston		noon, July	2..Constructing sewers	Thos. F. Sullivan, Com. of Pub. Wks.
D. C., Washington		2 p.m., July	18..Constructing sewer system at Toadlene School under jurisdiction of San Juan school, Shiprock, N. Mex.	Dept. of Interior, Office of Indian Affairs.
WATER SUPPLY.				
N. C., Raleigh		July	1..5,000,000 gallon steam turbine centrifugal pump; 4,000,000 gallon motor-driven centrifugal pump; 500,000-gal. filter; 3,300 ft. 22 or 24-inch wood pipe; 6 tons 16-inch, 13 tons 12-inch and 21 tons 24-inch iron pipe	Supt. of Water Wks.
S. D., Clear Lake		2 p.m., July	3..40,000-gal. reservoir	J. H. Lunde, Chrm. of Com.
D. C., Washington		2 p.m., July	18..Constructing water supply and distribution system at Toadlene School under jurisdiction of San Juan school, Shiprock, N. Mex.	Dept. of Interior, Office of Indian Affairs.
FIRE EQUIPMENT.				
Col., Towaco		June 29	Two hose carts, 400 ft. 2½-in. cotton hose, two long hose pipes, two rubber tubes, six hydrants	Axel Johnston, Agt., Ute Mountain Indian School.
O., Sandusky		noon, July	5..Motor-driven triple combination pumping engine with 750-gallon capacity; motor-driven 50-ft. service ladder truck; one 1½-ton commercial chassis and one 1-ton commercial chassis	G. M. Zimmerman, City Mgr.
Kan., Winfield		July 15	Motor combination pump and hose car, 500 gallons minimum capacity	W. C. Hall, City Clk.
BRIDGES.				
Cal., San Jose		11 a.m., July	8..Constructing five reinforced concrete bridges	H. A. Pfister, Co. Clk.
MISCELLANEOUS.				
Md., Baltimore		11 a.m., July	3..52,040 stamped tin license plates, 35,000 German silver dog license tags and 2,600 vender badges	Daniel J. Loden, Col. of Water Rents and Licenses.

OFFICIAL ADVERTISING

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Bids received until July 10, 1918.

48-In. Reinforced-Concrete Conduit

CONTRACT 26
HARTFORD, CONN.

Sealed proposals, addressed to the Board of Water Commissioners of the City of Hartford, will be received at the Office of the Board, Municipal Building, Hartford, until 12:00 M., Wednesday, July 10, 1918, for the construction of a 48-inch reinforced concrete pressure conduit approximately 4,800 feet long, built either in place or of precast pipe. Plans and specifications may be obtained after June 29, at the office of the Manager

and Chief Engineer, on deposit of \$4.00, which will be refunded on the return, in good condition, of both plans and specifications. Specifications used in making a bid will be considered as returned. Prior to June 29th, plans may be seen at the office of the Manager and Chief Engineer and the site of the work visited.

A certified check or cashier's check for \$2500 must accompany each bid and the successful bidder will be required to furnish bonds in the sum of \$60,000.

The right is reserved to reject any and all bids.

BOARD OF WATER COMMISSIONERS.
FRANK E. HOWARD,
President.
FRED D. BERRY,
Secretary.

CALEB MILLS SAVILLE,
Manager and Chief Engineer.
Pilgurd Building, 1026 Main Street, Hartford, Conn.

Bids received until July 11, 1918.

Highway Reconstruction HARRISBURG, PA.

Pennsylvania State Highway Department, Harrisburg, Pa.—Sealed proposals will be received at said office until 10 A. M., July 11, 1918, when bids will be publicly opened and

scheduled and contracts awarded as soon thereafter as possible for the reconstruction of the following pavements: 1,269 linear feet of One Course Plain Cement Concrete in Blair County; 4,983 linear feet of either Vitrified Block on a Concrete Base or One Course Plain Cement Concrete in Cambria County; 17,049 linear feet of One Course Plain Cement Concrete and 2,334 linear feet of either One Course Plain Cement Concrete or Bituminous Concrete and Hillside Vitrified Block on a Concrete Foundation in Chester County; 1,842 linear feet of Vitrified Block in Clarion County; 15,918 linear feet of either One Course Plain Cement Concrete or Bituminous Concrete on a Concrete Foundation in Erie County; 13,881 linear feet of One Course Plain Cement Concrete in Mercer County; 18,083 linear feet of One Course Plain Cement Concrete and Hillside Vitrified Block on a Concrete Foundation in Greene County and for the grading and drainage of 3,319 feet of roadway in Washington County. Bidding blanks and specifications may be obtained free and plans upon payment of \$2.50 per set upon application to State Highway Department, Harrisburg. No refund for plans returned. They can also be seen at office of the State Highway Department, Harrisburg; 1001 Chestnut Street, Philadelphia, and 904 Hartje Building, Pittsburgh. J. D. O'NEIL, State Highway Commissioner.

STREETS AND ROADS.

Berkeley, Cal.—City council passed resolution ordering curbing of 4th St. from Gilman to Harrison Sts., a distance of approximately 500 ft.

New Carlisle, Ind.—Completion of a segment of Lincoln way west, just east of here, will take place immediately according to a decision of the county commissioner; paved with concrete.

South Bend, Ind.—Members of the board of public works decided to use Terico oil asphalt paving material on Blaine avenue and Harvey St.

Great Falls, Mont.—John E. Moran, clerk of Cascade county will receive sealed bids until 10:30 a. m., July 30, for \$243,000 10½-11½-year optional and \$224,000 10-16-11 1-6 year average not exceeding 6 per cent semi-annual road bonds.

Albany, N. Y.—The National City Co. of New York were the successful bidders for the following bonds, aggregating \$305,000, street improvement \$182,000, street improvement \$123,000.

Madison, O.—Another effort is to be made to pave the North Ridge road through Madison and Perry townships and a part of Panesville township. At the last offering of the road work for competitive bids, there was no response. Since then new estimates have been made. In Painesville and Perry townships there is a total of 7.715 miles. The estimated cost of monolithic brick paving is \$213,740.70; of concrete, \$214,537.52. In Madison township the entire distance is 5.433 miles. The estimated cost of monolithic brick paving is \$150,626.31; of concrete, \$148,169.17. The total cost of brick paving would be \$364,367.01; the total cost of concrete, \$362,706.69. Using the brick as a basis of figuring, and taking the distance across Madison township, the cost would be \$27,540.27 per mile, according to the engineer's estimate. Using concrete pavement across Madison township, it would cost \$27,372.07 per mile.

Erie, Pa.—An ordinance passed by council fixing a roadway in Dunn St.,

from Fifth to the Lake road, was approved by the commission.

Germantown, Pa.—Councilman Borthwick introduced bills to repave Seymour St. from Germantown Ave. to Wakefield St., and to locate electric lights at Hortter and Ross Sts., Hortter and Musgrave Sts. and Hortter and Chew Sts.

Harrisburg, Pa.—The sum of \$6,889.74 will be distributed among the second class townships of Perry county, which have qualified to receive their share of the 1911 cash road tax bonus. This money may be spent by the supervisors for the improvement of the township roads and bridges, providing the plans meet with the approval of the Bureau of Township Highways of the State Highway Department. The following townships have complied with all of the law's requirements and will receive amounts as indicated below: Buffalo, \$581.74; Carroll, \$648.36; Center, \$681.62; Greenwood, \$785.64; Jackson, \$465.92; Liverpool, \$551.23; Miller, \$336.73; N.E. Madison, \$432.59; Penn, \$578.71; Rye, \$453.00; Spring, \$210.42; Toboyno, \$172.50; Tuscarora, \$365.47; Tyrone, \$370.01; Watts, \$255.80.

Harrisburg, Pa.—Snyder county's share of the 1911 cash road tax bonus amounts to \$5,874.39, which sum will be distributed among the eligible second-class townships during the year. Snyder county has a township road mileage aggregating over seven hundred miles and this money will be at the disposal of the township supervisors for road improvement purposes.

State highway commissioner J. Denny O'Neil has certified the following amounts for payment to the townships: Balance due for 1911 and payable during 1918—Adams, \$330.54; Beaver, \$426.04; Center, \$319.42; Chapman, \$353.08; Jackson, \$507.15; Middlecreek, \$539.05; Monroe, \$490.34; Penn, \$684.14; Perry, \$643.61; Union, \$537.82; Washington, \$993.20.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Joliet, Ill.—Ralph H. Newkirk and the Powers-Thompson Construction com-

pany presented bids for the South Chicago street paving and R. F. Conway company only bidder for the McDonough St. paving; Curtiss and Tyndall and George F. Powers, bidders for the McDonough St. sewer. O. Callahan, city engr.

Richmond, Ind.—*Daniel G. Burkhardt for the construction of cement curbs, gutters and sidewalks on South Third St. from Main to A St.

Detroit, Mich.—*Detroit Asphalt Paving Co., this city, for grading and paving with asphaltic concrete Miller road, at \$62,082; McGraw Ave., at \$19,742; Forest Ave., at \$10,526; Greusel Ave., at \$7,814; Friggin Ave., at \$5,654; Dunn road at \$44,807. *W. B. Brady Construction Co. this city, for Clarendon Ave., at \$15,658; Fernwood Ave., at \$13,262; Arcadia Ave., at \$6,960, and *Thos. E. Currie, for grading and paving with 2-in. top concrete, Riopelle St., at \$3,331.

Ishpeming, Mich.—*Pilliner & Rellmer, Marquette, Mich., building 3 roads in Marquette county. Frank Jeus, clerk.

Kalamazoo, Mich.—*H. L. Vanderhorst, this city, and H. A. Hoxey, Grand Rapids, for constructing six miles of concrete road on the main highway bet. Grand Rapids and here.

Missoula, Mont.—*Rajotte, Torbet & Winters, 521 Ry. Exch., Seattle, Wash., for building 4 miles of road along Clark Fork river.

Beatrice, Neb.—*Abel Constr. Co., Lincoln, for paving Dist. No. 36, \$8,000; asphalt.

Albany, N. Y.—*Wm. T. Campion, 372 Broadway, for improving short street. Board of contract and supply, Wachenman, sec'y, City Hall.

Baraboo, Wis.—*Thos. Wooly, La Crosse, bid low for paving 2nd Ave. with brick, at \$1.64 sq. yd.; Gen. Contr. Co., Plymouth bldg., Minneapolis, bid low for paving with bit.

Meeme, Wis.—*Steve Knechtel, Manitowoc, Wis., for grading and surfacing Green Bay road.

SEWERAGE

Brazil, Ind.—Plans and specifications will be prepared at once for a new system of sanitary sewer running from the Houk sewer east of Forest avenue to an alley west of Walnut street.

Davenport, Ia.—City council asking bids for building two sewers.

Hawkeye, Ia.—Engr. C. H. Currie, Webster City, preparing preliminary plans building sanitary sewers.

Cloris, N. Mex.—See "Water Supply."

Albany, N. Y.—The Sinking Fund Commissioners purchased the Beaver Creek, sewer bonds.

Ironton, O.—Council referred petition for a sewer at Third and Pleasant Sts. to the street committee.

Sandusky, O.—See "Water Supply."

Geary, Okla.—City sold to R. J. Edwards sewer bonds to the amount of \$30,000. H. E. Summers, City Clk.

Pittston, Pa.—Engr. J. F. Langan, Miners' Bank Bldg., drawing plans for t. c. pipe sewer on Church St. \$8,000.

Winchester, Va.—Plans being drawn for sewage disposal plant; \$25,000; 800,000 gals. capacity. Engr., C. C. Hopkins, 349 Cutler Bldg., Rochester, N. Y.

Martinsburg, W. Va.—John H. Zirkle, City Clk., will shortly take new bids on 1,520 ft. 24-in. t. c. pipe sewer in various streets. Thomas Sparrow, Engr. P. W. Leighton, Mayor.

Sparta, Wis.—City will soon start work on installing sanitary sewer, E. Oak St., about 325 ft. 8-in. vit. pipe. W. G. Blyton, City Clk.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Joliet, Ill.—See "Streets and Roads."

Rockford, Ill.—*G. W. Mulholland, 1227 Camp Ave., for installing 240 ft. 9-in. vit. pipe sewer in Adams St. Board of Local Improvements, S. B. Hand, Engr.

French Lick, Ind.—*A. Z. Elledge, for installing 5,300 ft. san. sewer. Board of Trustees, Claude F. Harmon, Clk.

Sandusky, O.—*Hombberger & Wagar, to build a sewer from the first alley east of Camp St. to Central Ave.; \$3,207.50.

New Castle, Pa.—*Elder & Ferry, at \$1,136, for installing vit. pipe san. sewer in portions of Scott St. City Council, C. H. Milholland, City Engr.

WATER SUPPLY.

Pittsfield, Mass.—Water main extensions, to cost \$10,000, ordered by Council.

Clavis, N. Mex.—Jas. N. Wright & Co. of Denver, were the successful bidders for an issue of water and sewer bonds, \$75,000. C. D. Cone, City Clk.

Amsterdam, N. Y.—City Treas. McQuillin Fritcher will receive bids until 1 P. M., July 1, for the following bonds: \$65,000 fire and \$53,000 water.

Sandusky, O.—City Commissioners passed resolution authorizing purchase of two new boilers for the waterworks station, at a cost of \$18,000, and the purchase of property to insure a roadway to the sewage disposal plant from W. Monroe St.

Geary, Okla.—An issue of waterworks bonds to the amount of \$10,000 was sold to R. J. Edwards, of Oklahoma City. H. E. Summers, City Clk.

Britton, S. D.—Standpipe and reservoir bonds to the amount of \$15,000 were purchased by John Nuveen & Co., of Chicago.

Brady, Tex.—Waterworks bonds of \$25,000 were awarded to J. L. Arlitt, of Austin, Tex.

Bluefield, W. Va.—An arrangement has been made with the Bluefield Waterworks & Impt. Co. looking to the taking over of that company's water plant in this city by local people. The company has agreed to sell the plant for \$500,000 and the stock will be offered to Bluefield and Coalfield investors first. Wm. McCarthy has been the Supt. here.

Mullins, W. Va.—The Wyoming Water & Light Co. will build water plant.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Peshtigo, Wis.—*Jorgenson Const. Co., Denmark, for dam on Peshtigo River.

Shawano, Wis.—*Michigan Pipe Co., Chicago, for 400 ft. 6-in. wood stave pipe; 100 ft. 6-in. galv. iron pipe and fittings to *Rundle-Spence Mfg. Co., 61 2nd St., Milwaukee. Engr., W. G. Kirchoffer, Madison. \$2,500.

LIGHTING AND POWER

Augusta, Kan.—For electrical improvements \$45,000 has been voted.

Germantown, Pa.—See "Streets and Roads."

FIRE EQUIPMENT.

Jackson, Cal.—Election held here for bonding city for \$5,000 for purchase of fire alarm system carried.

Amsterdam, N. Y.—See "Water Supply."

Gale, Okla.—To purchase fire apparatus, a \$20,000 bond issue is contemplated.

Clarendon, Va.—Chemical fire apparatus will be purchased at \$900. Citizens' Association.

BRIDGES.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Minto Township, Ont.—*John Tilker, Jr., Harriston, for building concrete truss bridge, 48 ft. long, at \$3,700; by Township Council.

Vaughan Township, Ont.—*Ritchie Cons. Co., Beamsville, general contract for erection of bridge for Township Council.

MISCELLANEOUS.

Washington, D. C. (Bureau of Foreign and Domestic Commerce, Department of Commerce).—Chamber of commerce in French West Africa wishes to receive catalogues and price lists in regard to: automobiles and horse vehicles; construction material; corrugated and patent roofing; hand cars for iron rails or trucks; hand and animal power pumps. Correspondence should be in French. If not possible for catalogues and printed matter to be in French, a letter in French should accompany same giving all proper information. Refer to Opportunity No. 27095.

Washington, D. C. (Bureau of Foreign and Domestic Commerce, Department of Commerce).—A man in England wishes to secure an agency for the sale of electrical material, such as wiring, sockets, fuses, lamps, contacts, switches, etc. Quotations may be made f. o. b. New York. Payment will be made by cash against bill of lading. Reference. Refer to Opportunity No. 27093.

Washington, D. C. (Bureau of Foreign and Domestic Commerce, Department of Commerce).—A man in England desires to secure an agency for the sale of engineering supplies, such as steels, iron, drills, files, belting, asbestos, packings, and small tools. Quotations should be made f. o. b. New York. Payment will be made by cash against ocean bill of lading. Reference. Refer to Opportunity No. 27101.

Washington, D. C. (Bureau of Foreign and Domestic Commerce, Department of Commerce).—A man in the French West Indies desires a 25-h.p. engine using heavy oil or kerosene as fuel and a complete plant for treating about 1,320 gallons of excrements every 12 hours for the extraction of sulphate of ammonia and for converting the residue into fertilizer. A plant is also desired to be run in connection with above for the conversion of about 12 cu. yds. of garbage per day, into fertilizer. It is desired that a man be sent with the machinery to install it and run same for a few months. Quotations

may be made f. o. b. New York. Payment will be made one-half with order and balance on arrival of goods. Correspondence should be in French. References. Refer to Opportunity No. 27117.

Rock Island, Ill.—Bids for collection of garbage now burned in the city's incinerator will be opened the latter part of this month.

Goshen, Ind.—See "Bridges."

Lebanon, Ind.—Boone County Circuit Court has confirmed assessments and authorized construction of Lora E. Edlin et al. drains, an open ditch 26 miles long, including tributaries, which will affect 35,000 acres in the southwest part of Boone County and Eel River Township in Hendricks County. Drain begins near this city and runs in a general southwesterly course through Center, Harrison and Jackson Townships, along the former course of a stream known as Eel River. Estimated cost of work is \$78,840. Wm. H. Moore, this city, has been named as Supt. of Const. and is planning to let the contract and begin work this year. Greater part of drain will be dredged, and it will require two years to do work.

Springfield, Mass.—Blake Bros. & Co., Boston, successful bidder for an issue temporary loan to the amount of \$600,000.

Hoboken, N. J.—City commission granted permission to the National War Work Conference of the Y. M. C. A. to erect a building to cost \$50,000 for soldiers and sailors in Hudson Square Park. Former Governor James F. Fielder and John P. Munn, chairman of the Bureau of Transportation.

Brooklyn, N. Y.—The New York Harbor Line Board will hold a public hearing in the Flushing town hall on July 11 on the modification of the pierhead and bulkhead lines on the east and west side of the Flushing River, according to a communication presented to the board of estimate by Brigadier General Theodore A. Bingham, Boro. Pres. Connolly.

Flushing, N. Y.—See "Sewerage."

Canton, O.—State Public Utilities Commission has granted Northern Ohio Traction & Light Co. permission to issue \$900,000 5 per cent bonds and \$180,000 preferred stock, for extensions on N. O. T. lines in northeast and southwest sections of city and other improvements on the Canton lines of the company.

Cincinnati, O.—Tentative plans for a clubhouse and auditorium at the Zoo, to cost about \$150,000, were submitted to Building Commissioner Geo. Rendigs for approval.

Toledo, O.—City receiving bids July 22 for \$100,000 park and boulevard bonds. Jas. S. Martin, Director of Finance.

Klamath Falls, Ore.—See "Streets and Roads."

Johnstown, Pa.—Cambria Steel Co. is developing residential section extension to Franklin borough; appropriated \$250,000 to begin 100 houses at once, with additional money available as needed. Features include cement sidewalks, light, heat, grass parking, storm water run through storm sewers of plant and house sewage through Franklin borough sewers, water from Conemaugh & Franklin Water Co. and electricity from Citizens' Light, Heat & Power Co.

Throop, Pa.—Rudolph Kleybolte Co., of Cincinnati, successful bidder, refunding bonds \$65,000.

Portsmouth, Va.—City council disposed of \$82,500 of city refunding bonds to J. C. Mayer & Co., of Cincinnati, for \$83,805.21.

Tacoma, Wash.—Park board authorized the purchase of 500 steel framed park benches, the erection of a public drinking fountain for Manitou Park; will spend \$6,000 on improving Nereides bath.

Superior, Wis.—Health Commissioner McGill is making investigations into the cost of installing the various styles of incinerations and will offer recommendations to be acted upon by the city commission shortly.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Sacramento, Cal.—For 1,000,000 seals to be used by the State motor vehicle department as the license tag on automobile number plates for 1910, by the State Board of Control to the *Kittling Manufacturing Company of Los Angeles. Cost \$15,800.

San Antonio, Tex.—*Jacob Wagner for the construction of the reinforced concrete garbage loading station at Walnut and Nevada Sts., \$8,000 to cover the cost was appropriated.

EQUIPMENT BARGAINS

24 inch CAST IRON PIPE

12,000 ft. First Class Bell and Spigot,
12 ft. lengths; weight, 183 lbs. per ft.

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2—9-ton Davenport 24-in. gage, s. t.
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Dump Cars

10—Atlas 1½-yd., 36-in. gage, V-shape,
all-metal side dump. First class.

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1—7x10 Lidgerwood DCDD, with boiler....	1,100
1—7x10 Lambert, 3 drum, with boiler....	1,600
1—8x12 Mundy DCDD, with boiler....	1,800
1—8x10 Lidgerwood, 3 drum, 32" drums, without boiler	1,000
With boiler	2,300
1—5x8 DCDD Reversible O&S, with vertical engine, without boiler....	350
With boiler	550
1—7x10 Lambert DCDD, with boiler....	1,100

COMPRESSORS

	Price
1—12x12 Laidlaw-Dunn-Gordon, belt driven, capacity 300'	\$750
1—12x12x16 Ingersoll, straight line, steam driven, capacity about 300' at 80 to 100 lbs.	600
1—Sullivan, 2 stage air, simple steam, ca- pacity 1800' at 80 to 100 lbs.	2,500
2—14x12 Bury Duplex, belt driven, capacity about 550' at 60 to 80 lbs., each.	1,000
1—14x16x10x16 Sullivan, 2 stage air, simple steam, capacity 600' at 80 to 100 lbs.	1,500
1—14x8x10 Bury, 2 stage, belt driven, ca- pacity 350'	1,500
1—Ingersoll-Rand Imperial Type KB2, 500' ..	2,000

DRAGLINES

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1—Monaghan-Walker steam machine, with 50' boom, 1¼ yd. bucket, almost new....	\$7,000
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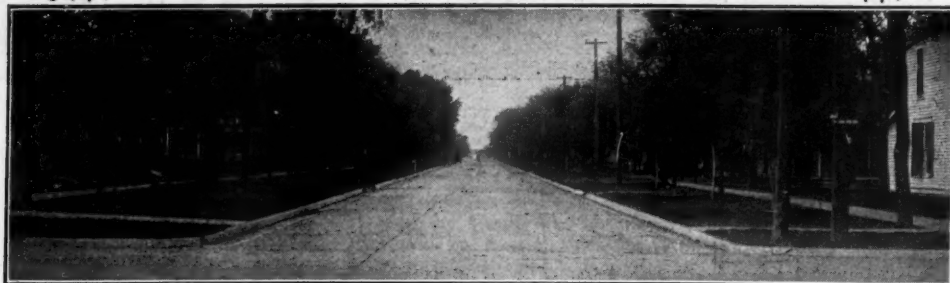
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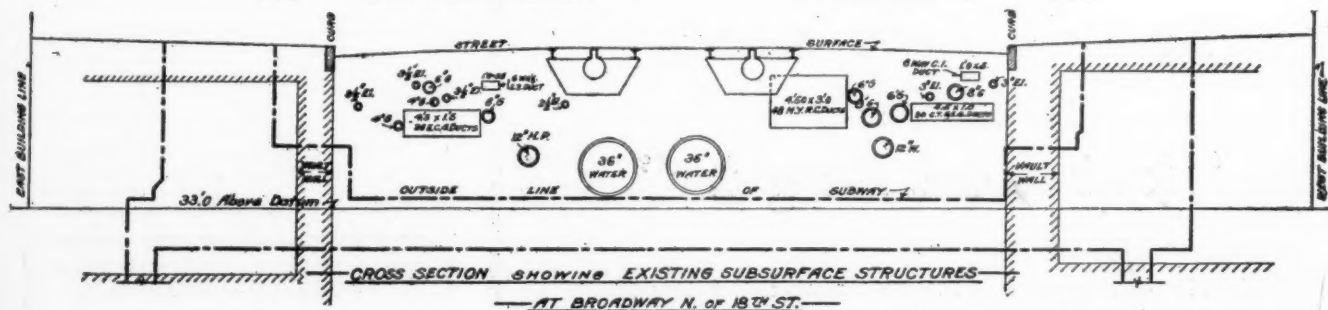
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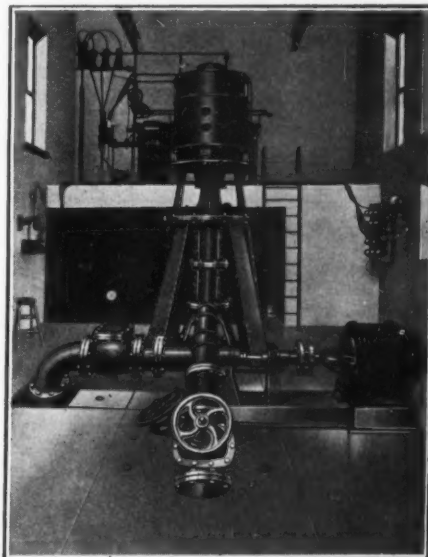
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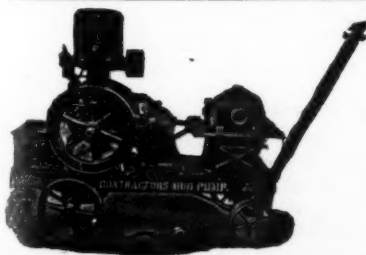
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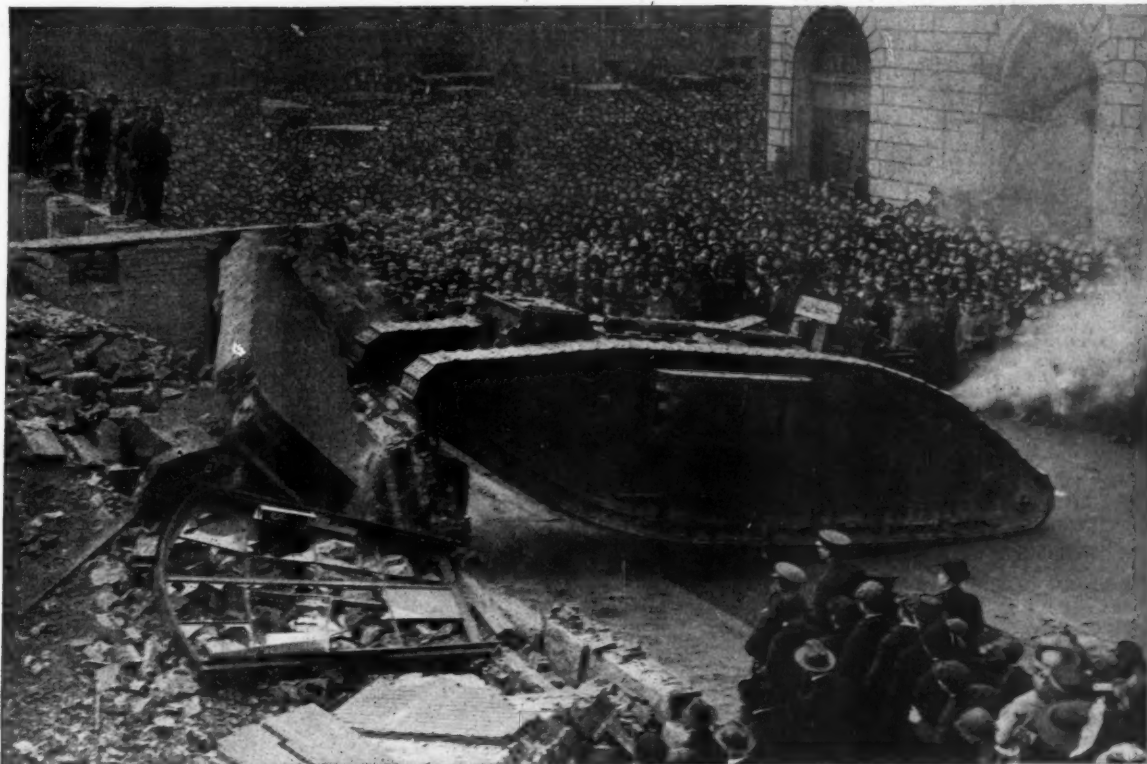
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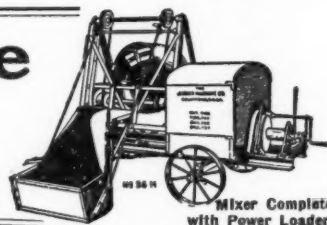


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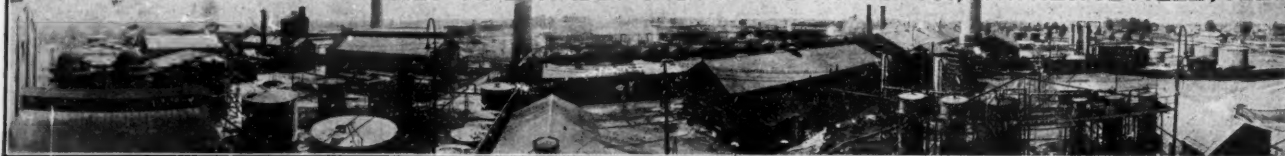
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